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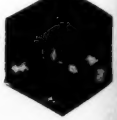

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Printed in U. S. A.

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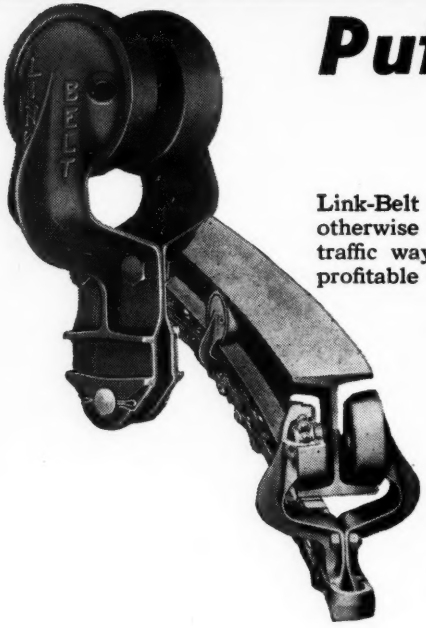

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One Answer to Some Production Cleaning Problems

Mr. Arthur P. Schulze's comprehensive treatise on the cleaning of zinc base die castings, Part II of which appears in this issue of PRODUCTS FINISHING, prompts the mention of some cleaning problems that occur in connection with the cleaning of steel either for synthetic or porcelain enameling.

The conventional arrangement of a manufacturing plant usually involves provision for the mechanical washing of all parts which must be formed by drawing with pigmented drawing compounds whether they are to receive paint or porcelain enamel. This is not essential in the case of parts which may be formed with emulsifiable non-pigmented drawing compounds. Such parts normally go directly to the porcelain enamel cleaning and pickling setup or to the cleaning and phosphatizing operation and can be processed easily.

Some difficulties, however, arise in the course of normal operation and may cause trouble either in the organic finishing department or porcelain enameling department. One possibility is that drawing compounds may remain on the steel parts for a period of time sufficient to result in a chemical reaction between the steel and the fatty acid in the drawing compound. The reaction product cannot be removed readily from the surface of the steel in the conventional porcelain enamel or organic finishing cleaning cycle. To prevent the formation of the reaction product, parts may be processed promptly or, if production scheduling makes this impossible, they may be washed in a mechanical washer regulated so as to leave a sufficient amount of soapy film on the metal to prevent rust in storage.

Another difficulty which may arise is that the parts may become contaminated with lubricant from dies and forming presses. This lubricant is most difficult to remove either in a porcelain enamel cleaning cycle or in a cleaning and phosphatizing cycle prior to organic finishing. If the contamination is identified promptly, it can be removed through the use of organic solvents; or, some provision can be made for washing the parts mechanically prior to the normal finishing cycles.

Another source of difficulty involves the formation of a soluble gum on the surface of the metal parts as a result of heat liberated at the electrodes during resistance welding. Parts fabricated with the aid of pigmented or non-pigmented drawing compounds sometimes accumulate excessive quantities of such compounds on areas near subsequent resistance welds. At the weld itself, the heat liberated is sufficient to char the drawing compound so that it may be washed off in the cleaner. However, at some distance from the source of heat the temperature is high enough to cause gum formation but not high enough to char, and these spots of a gummy nature can then only be removed completely by scrubbing with porcelain enamel slip or

(Over)

some other equally harsh abrasive material. The formation of these gummy spots may be prevented either by very close attention to the amount of drawing compound used at the forming presses (often a difficult matter) or by making provision so that such parts are washed mechanically as a routine operation after they are formed.

A less frequent cause of trouble but nonetheless an annoying one is the case in which forming press operators use a pigmented drawing compound by mistake on parts that should not be formed with that compound. Then, when such parts are routed to the porcelain enameling department, the compound cannot be removed satisfactorily and process difficulties immediately result. This difficulty likewise may be obviated through the use of a mechancal washer as a routine measure.

In many cases the floor space available for finishing operations is so limited and so critical that process engineers are not always free to install mechanical washers so that all parts may be thus processed. Further, it is not to be construed that mechanical washing is the only way to solve these difficulties. However, if facilities can be expanded to include a mechanical washer, such equipment will usually assist in providing a smooth flow of parts through the finishing system and save the finishing supervisor considerable mental stress.

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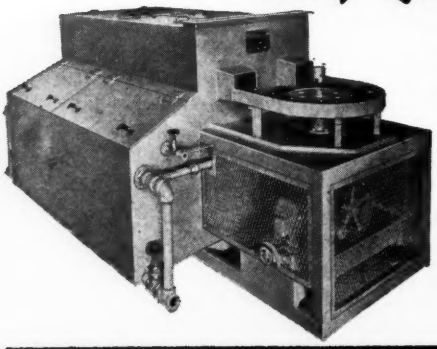

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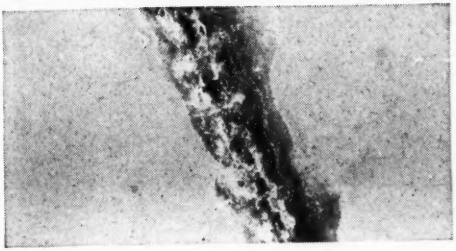

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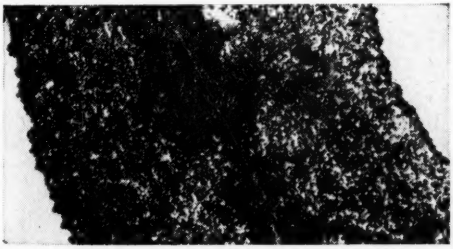

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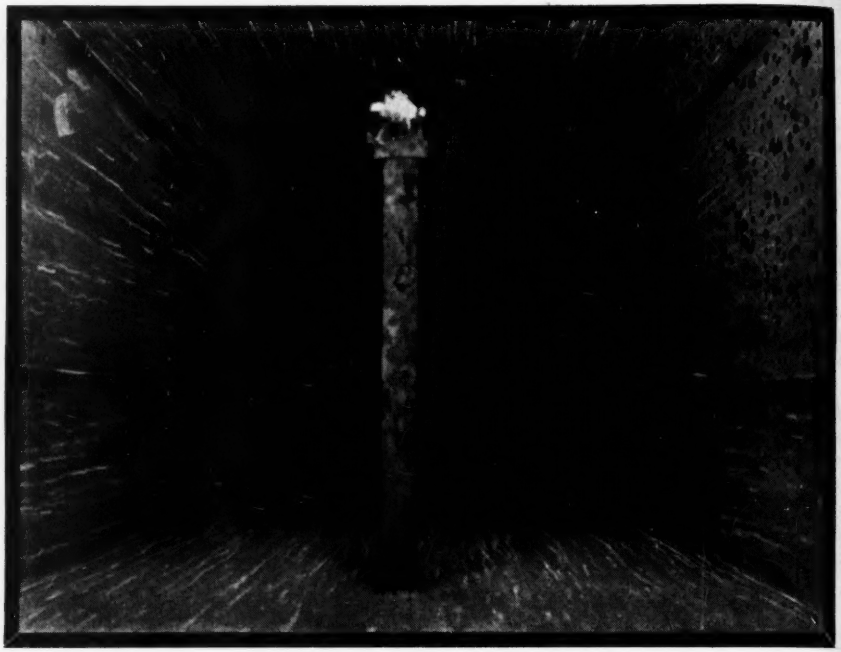


Water Wash Spray Booth Operations

Typical Methods and Equipment Employed in Complete Extraction of Off-Spray from the Exhaust Air Stream in Water Wash Spray Booths

By FRED M. BURT

PF FEATURE

To show in detail how pigment-laden air is exhausted from spray booths through water systems so that when it emerges from the exhaust stacks it has all of the foreign particles "scrubbed" from the air, an installation at Weber Showcase & Fixture Co., Los Angeles, will be used as the principal illustrative subject, along with supplementary explanatory drawings. The installation as illustrated was used for the continuous spraying

Fig. 1—(Above) View looking down into spray booth exhaust stream stack

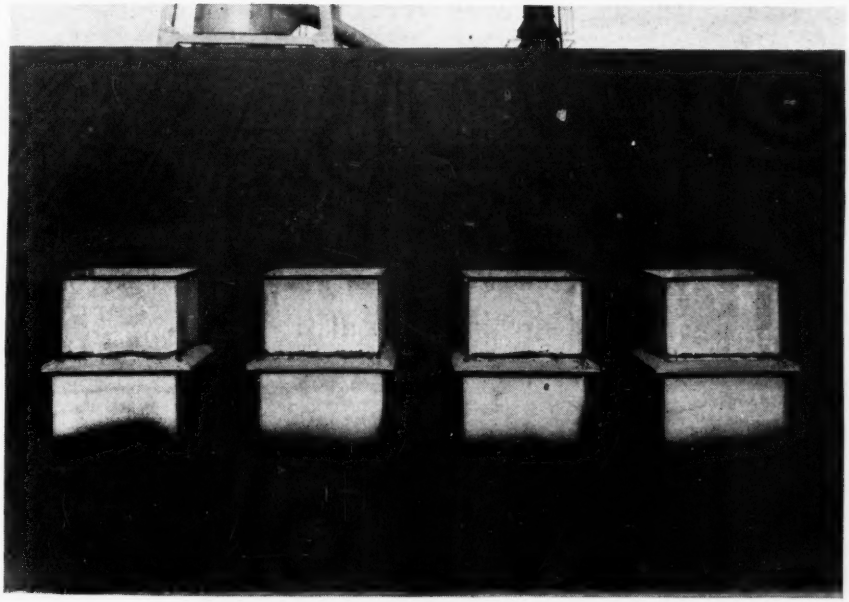
of zinc chromate primer and Navy gray synthetic enamel on life rafts and for other heavy production jobs. With some changes in arrangement, to fit with the present peacetime production flow, it operates in the same way with the same efficiency.

Efficient water wash units may have certain differences in design, but they must all embody the same general principles to effect a complete removal of pigment and dust particles; namely, the introduction into the booth of proper volumes of filtered cleaned air (when indicated and possible) and its movement, at the correct velocity, from the working area where the spraying is done through the water wash section, with the washing or scrubbing action of the water so applied that the air moves on but leaves behind all particles with which it has been laden.

Figs. 1 and 2 show that the Weber installation (designed, built, and installed by Acme Associates, Inc., Los Angeles) thus removes these particles. These pictures were taken after two years of continuous heavy operation of the installation, and no cleaning whatever has been done either inside the stacks or above on the roof.

Inside the 30-inch x 30-inch x 16-foot high stack shown in Fig. 1 the only deposits to mar the clean surface of the galvanized sheets are black tar spots from the installation of the flashing around the stack and the streaks from winter rains. The (Acme) blower can be seen at the bottom. The sprinkler head was installed to meet some insurance specification technicalities and is actually of no particular need or value. If the exhaust air was laden at all, there would be deposits around the stacks on the roof, but none are in evidence,

Fig. 2—External view of spray booth exhaust stream stacks, showing no paint or enameling deposits after two years of operation at Weber Showcase & Fixture Co., Los Angeles, Calif.



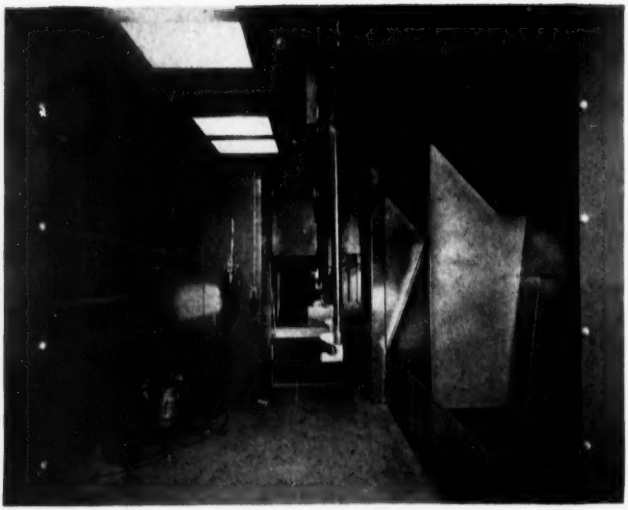


Fig. 4—Inside view of spray booth shown in Fig. 3

as shown in illustration Fig. 2.

Each of the three identical booths on the continuous overhead chain-conveyor spray line (see Fig. 3) is 15 feet long x 8 feet 6 inches high, with an 8 - foot working depth. At each end there are 4 x 4-foot vestibules with swinging doors for work passing through and to act as escape doors (see Fig. 4). In the wall opposite the water wash section are twenty-four 20 x 20 x 2-inch Airmaze Type K2 Kleenflo cleanable filters which are individually removable and are interlocked, wire mesh units carrying a film of special viscous oil to trap dust. After an accumulation of dust, the filters are removed, immersed in thinner to clean them, and then resprayed with oil.

In the ceiling of each spray booth are four 500-watt incandescent electric lights behind 22 x 24 x ¼-inch wire mesh glass windows and backed up by vaporproof, dome type, porcelain enameled reflectors.

The exhaust stream is drawn

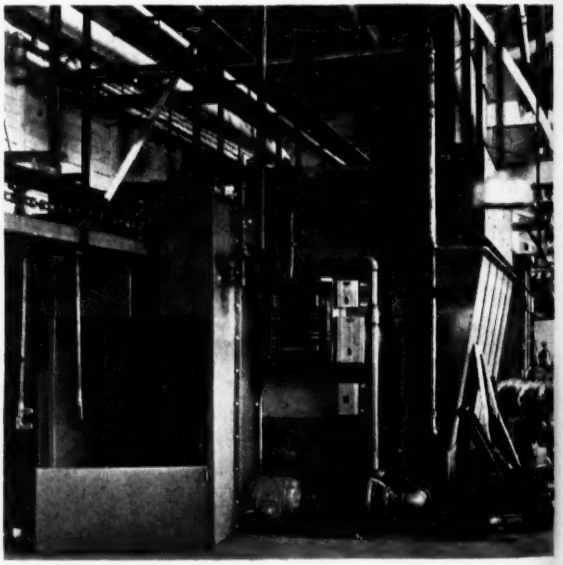


Fig. 3—One of three identical spray booths on a continuous line at Weber Showcase & Fixture Company

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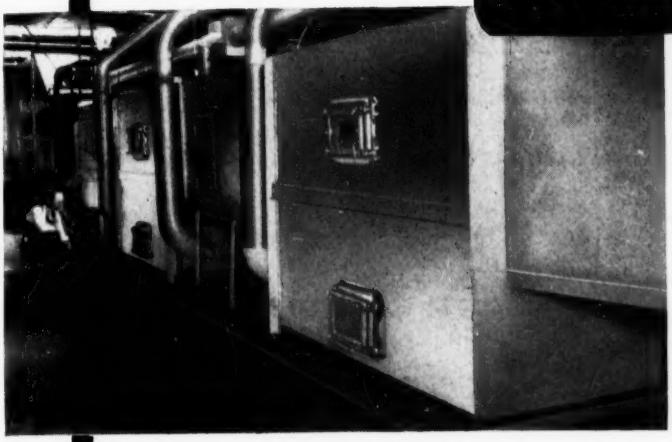

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across the working area at 150 feet per minute face velocity by three 21-inch (Acme) blowers with a total air capacity of 22,800 c.f.m. They are mounted on a common $1\frac{3}{16}$-inch shaft and driven by one 10 h.p. constant speed, 1,800 r.p.m. motor. A static pressure of $1\frac{1}{4}$ inches (water column) is provided. The water is recirculated from the collecting tank through the spray manifolds and nozzles by a 360-gallon per minute pump connected to a $7\frac{1}{2}$ h.p., 1,800 r.p.m. motor (see Fig. 5). In the make-up tank, which is connected to an outside water supply and which maintains a constant level in the collecting tank, a float valve is provided which is set at a predetermined level. When the water level drops, the float drops and opens the valve for admission of water to the proper height. The water from the collecting tank that enters the make-up box to maintain the like level comes from the bottom of the collecting tank, thus preventing any but clean water from entering the box as might be the case if the orifice were located at water level.

At a 150-foot per minute average face velocity, the air moves across the booth at a speed that changes the total air volume every three seconds—the length of time of travel across the 8-foot working depth. When the pigment-laden air is drawn out of the booth and up behind the inward sloping metal shield, it meets a downward spray from nozzles 9 inches apart in the horizontal manifold (see Fig. 6). The nearly head-on collision between the vigorous water spray and the

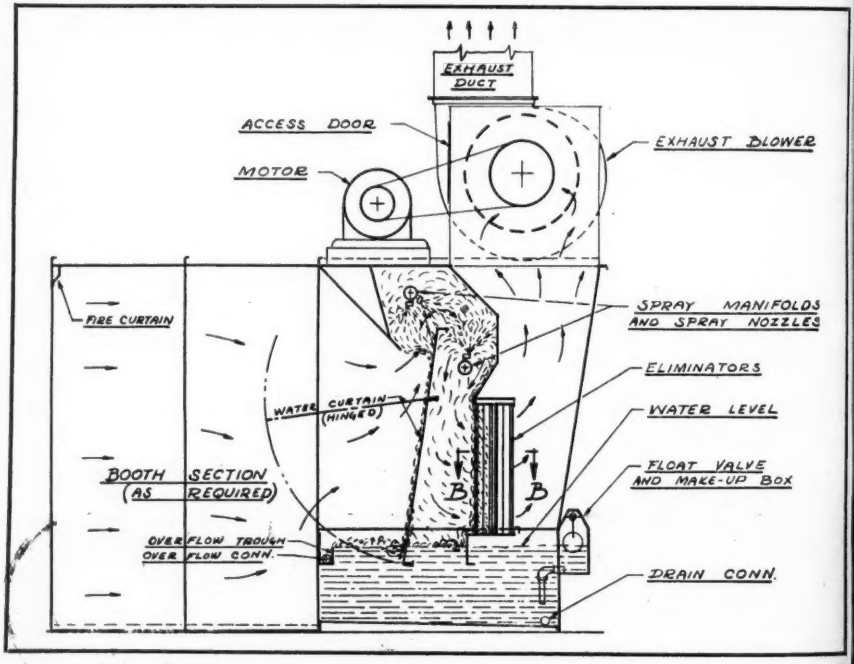

Fig. 5—Sectional side view of water wash spray booth

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upward - moving pigment particles effects a churning and battering of the particles, causing many of them to combine into larger particles. The larger the particles carried in the exhaust air stream, the greater the tendency to precipitate into the collecting tank when they start the downward travel toward it.

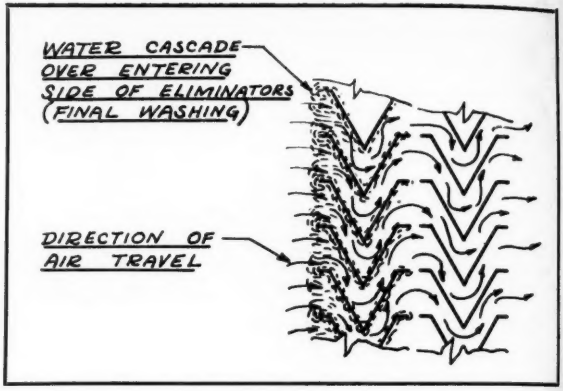
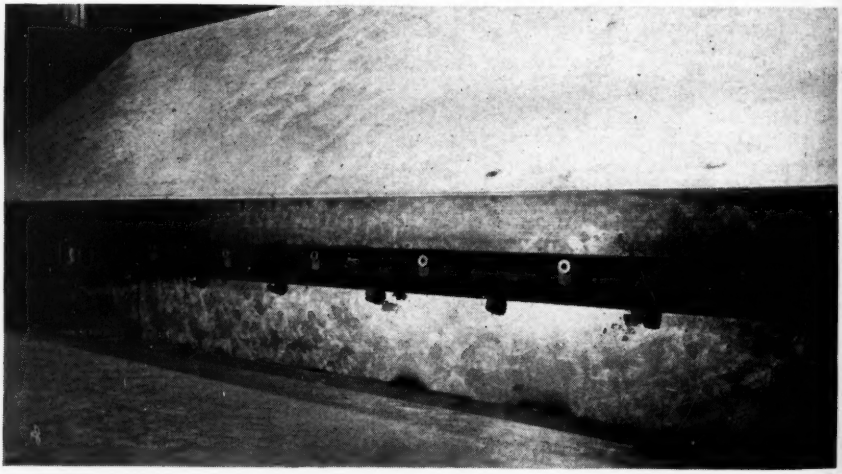


Fig. 7—Section at B-B (Fig. 5) through double vertical eliminators

As the air and particles pass over the water curtain shield and start downward, they are followed by spray jets from another set of nozzles in the same manifold at about 25 lb. pressure at the mouths. The particles are again hit and driven together by water impact at an acute angle of incidence to the general direction of air flow. Here the churning and battering is further heightened as the air and particles run nearly head on into an upward spray from similar nozzles in another manifold.

In the further downward travel, the heavier particles drop down into a collecting tank, ridding the exhaust stream of the greatest percentage of pigment particles. The rest of them are carried at increased velocity, which is accelerated the closer the air

Fig. 6—View looking up toward nozzles that spray water at 25 lb. pressure at the nozzle mouths



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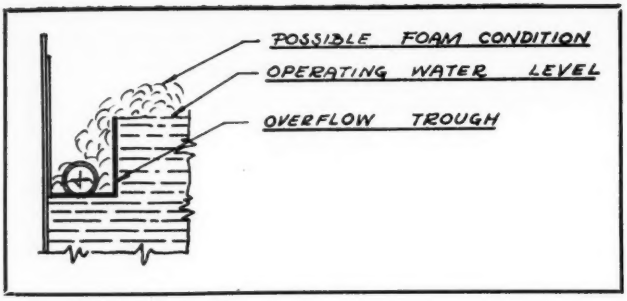

Fig. 9—Section at A-A (Fig. 8) through overflow trough

stream approaches the blowers, through double vertical eliminators (see Fig. 7). The distance from one side of the eliminator unit to the other is 8½ inches but the air travel distance is much greater since there are six turns or bends in the sinuous and tortuous progress of the air stream as it travels at about 600 feet per minute.

Hitting one side of the eliminator unit and then bouncing in about 90 degrees of curve to the opposite side, most of the particles in the moist air are driven by centrifugal force against the eliminator sides, along with the moisture also carried. The particles tend to cling to the metal sides of the eliminator unit and are washed downward by a cascade of water through the entering side of the unit to be precipitated into the collecting tank. By the time the air leaves the exit side of the eliminator unit, the last of the pigment particles and virtually all of the moisture has been removed from the onrushing air, which is then drawn up through the blower and out the exhaust stack, completely washed and scrubbed clean of particles and even rid of all excess moisture.

An innovation which prevents foaming liquid in the collecting tank from bubbling over its front wall into the spray booth is provided by a trough (see Figs. 8 and 9) along the tank front. Four inches down from the upper edge and 3 inches wide, this steel trough ranges from 2 to 8 inches deep

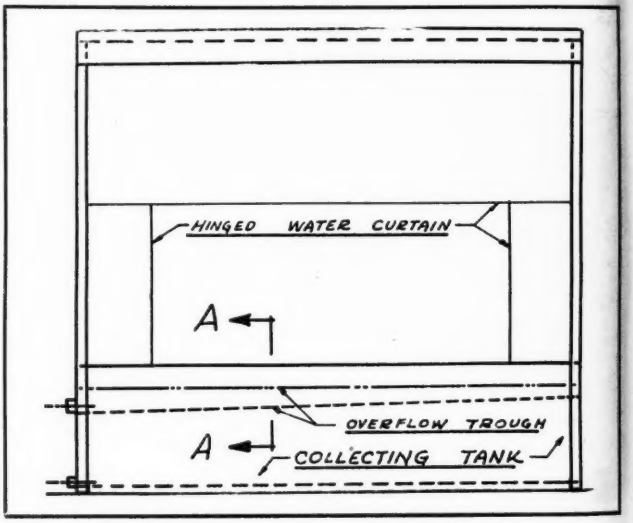

Fig. 8—Front view of collecting tank, showing location of hinged water curtain and overflow trough

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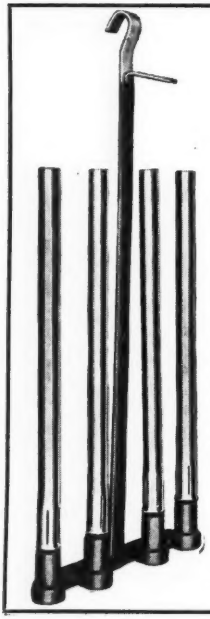
to provide an ample slope to carry away, to a sewer outlet, the liquid which is produced by the breaking down of the bubbles in the foam that is arrested by the trough in its tendency to overflow the tank. This foaming action is heightened by the addition of a deflocculator to the water in the collecting tank.

The deflocculator is added to the circulating water with an initial charge of ⅓ oz. per gallon, then further additions of 1/6 oz. per gallon every four hours of operating time. It is a dry, dustless, non-segregating granular chemical product composed of powerful ingredients, said to have a pleasing odor and to dissolve immediately and completely in cold water. An efficient deflocculator will have a high buffer index and high colloidal activity so as to work fast and effectively with no semi-active or inert ingredients.

When the particles of paint, enamel, or lacquer are washed out of the air and precipitated into the deflocculator solution in the collecting tank, the oil and resinous vehicles are readily wet out and emulsified, and the pigments are thoroughly dispersed. In other words, the flocculent masses (aggregate or compound masses of particles) are separated into non-flocculated masses or particles reduced to what is supposed to be a molecular state of subdivision. Thus, they cannot deposit on the metal walls, and cleanliness of all parts of the water wash system is maintained.

(Illustrations courtesy Acme Associates, Inc., Los Angeles, Calif.)

Color research men of the Pittsburgh Plate Glass Company's Paint Division relate that color definitely possesses energy to make us feel warm or cold, happy or depressed.



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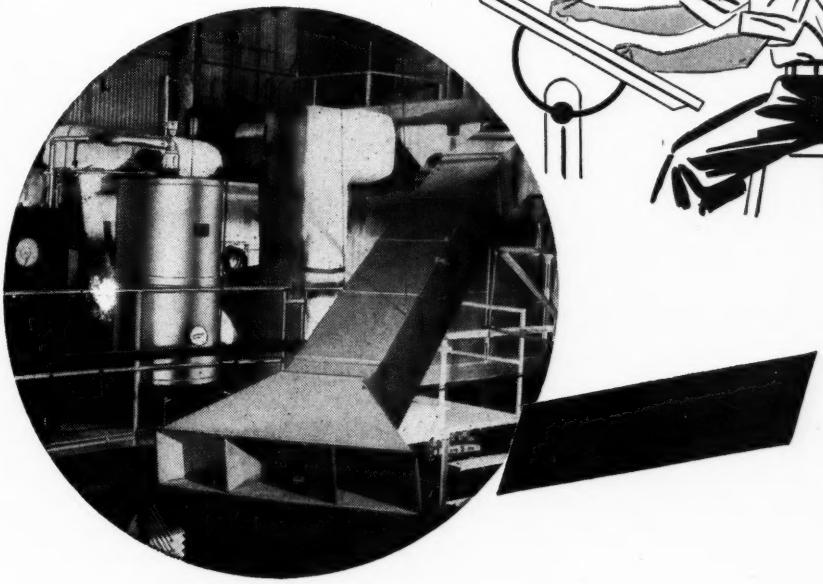

ANSWER...

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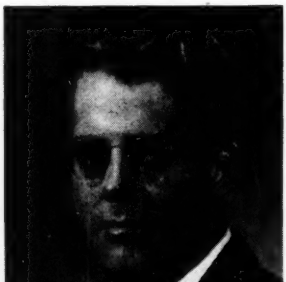
DIE CASTINGS *Must be clean*

II.

A Compendium of Cleaning Cycles Proved in Present-Day Production Practice

By ARTHUR P. SCHULZE

HAVING examined at close range last month the subject of solvent cleaning methods and their use as preparatory steps to the surface finishing of die castings, let us now turn our attention to the second general group of cleaning techniques in widespread application today; namely, those employing aqueous solutions of alkaline-type compositions.[1] These particular procedures may be segregated into three principal classifications according to the method used in applying the cleaning solution to the work: (1) hot still tank cleaning; (2) electrocleaning; (3) pressure-machine washing.

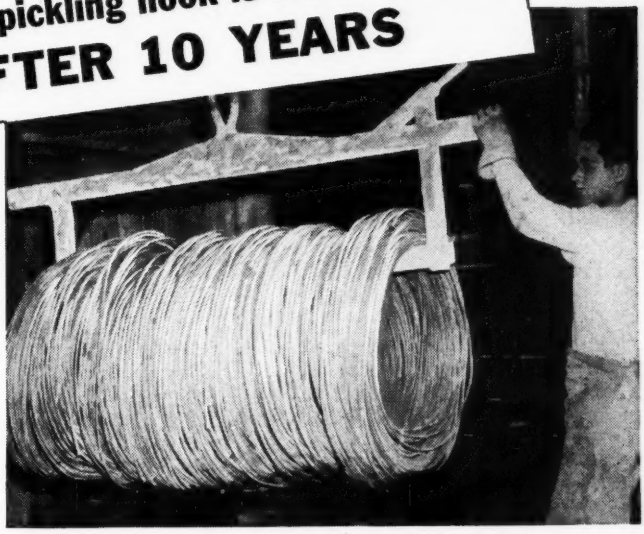


Arthur P. Schulze

Hot Tank Cleaning

Alkaline still tank cleaning probably is one of the most widely used methods of preparing die cast parts for finishing. It is, fundamentally, a simple operation that, with proper pH control, provides great economies and uniformity of quality.[2] Parts to be cleaned in this manner are immersed in a solution of the proper type for a required period; that is, until all alkaline-reactive surface contaminants are thoroughly removed. The strength of the solution, temperature and treatment time vary, depending upon the metal as well as the nature and amount of surface soil present.

Why this pickling hook is still in service AFTER 10 YEARS



These MONEL pickling hooks have handled coiled wire in pickling solutions—a ton at a time—for more than ten years, *and are still in service.* They are installed at the Birmingham mill of Lamson & Sessions.

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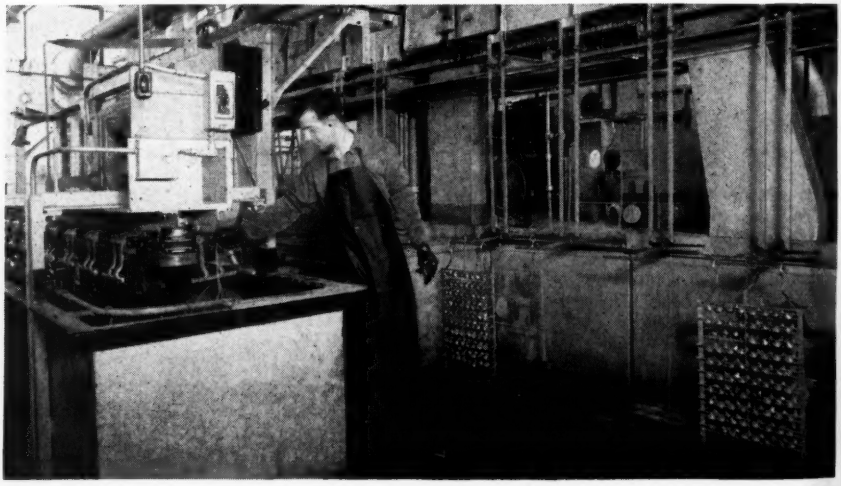
Aluminum die castings, for example, are frequently immersed from 3 to 10 minutes in a bath made up of 6 to 8 ounces of alkaline material per gallon of water and operated at a temperature of 150-200 deg. F. With magnesium castings, 5-15 minutes' immersion in a solution (4-8 oz. per gal.) at from 150-212 deg. F. has been found quite satisfactory. For zinc, a variety of methods is in general use to meet specific conditions. One, for instance, consists of immersing work from 1 to 5 minutes in a solution made up at a concentration of 4-6 ounces to each gallon of water, and used at a temperature of 180-190 deg. F. In preparing zinc base die castings for the Cronak process, phosphatizing, Iriditing or other similar commercially available surface treatments, an effective method is to immerse the work for approximately 2 minutes in a solution of a specified proprietary material operated at 212 deg. Fahrenheit.

Manufacturers of industrial cleaning compositions have developed a wide range of effective alkaline materials for cleaning die castings by the hot tank immersion technique. These compounds are scientifically blended and balanced for certain types of cleaning jobs. The compositions effectively remove animal and vegetable oils by saponification and mineral oils through emulsification; they are also effective in removing dust, dirt and loose scale, if the solution is provided with adequate mechanical agitation or ebullition or is blown with air. They should be used in accordance with the instructions of the manufacturer, since he is in a position to recommend the one best suited for prevailing conditions and desired results.[2,3] Recommendations for initial concentration

Fig. 1—Illustration pictures an installation in which a full automatic conveyor, incorporating cleaning, copper strike, rinsing, and drying operations, is used in conjunction wtih a semi-automatic conveyor for nickel plating. Zinc base die castings, brass, and steel parts are processed through the equipment. Those parts to be painted complete the full cycle on the automatic conveyor prior to painting. Parts to be nickel plated are removed from the full automatic conveyor after the copper strike operation and transferred to the semi-automatic conveyor for nickel plating.

(Photo courtesy Hanson-Van Winkle-Munning Co., Matawan, N. J.)



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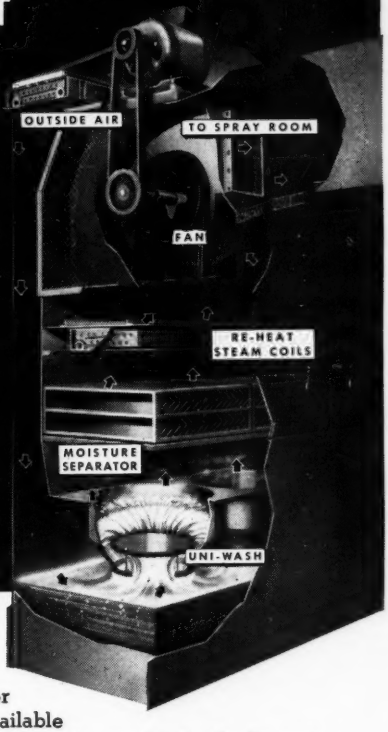

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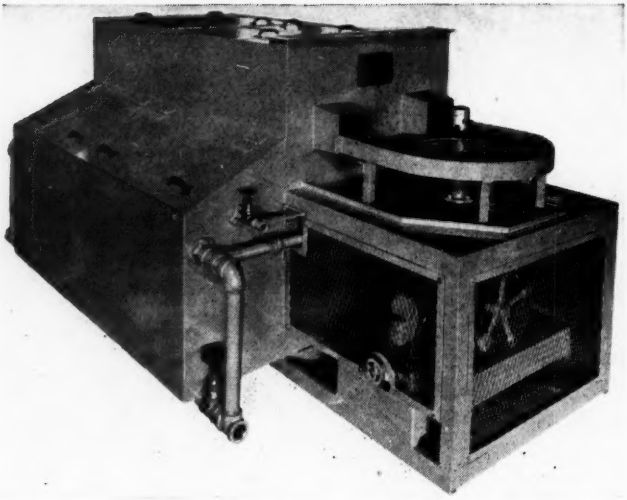

Fig. 2—Pictured herewith is a return type washing, rinsing, and drying machine used for cleaning and drying aluminum pistons. A special holding device transports the pistons through the washing and rinsing chambers and the hot air blast drier. Loading and unloading can be accomplished at one station. *(Photo courtesy Metalwash Machinery Corp., Irvington 11, New Jersey)*

and maintenance of solution should be exactingly followed.[4]

The selection of an alkaline cleaner is decidedly important. It must be remembered that aluminum, for example, is highly reactive to most alkaline materials and thus is rapidly attacked by alkali unless the solution is buffered to prevent such attack. Aluminum die cast parts lose tolerance or surface finish as a result of the etching action of these alkalies. Consequently, specially buffered alkaline cleaners for aluminum are now available for use at pH values which will not adversely affect aluminum surfaces.[2,4]

On the other hand, paradoxically, slight etching of the metal constitutes desirable aluminum-finishing surface-preparation practice on certain jobs.[5] In preparing work for the application of clear chemical or electrolytic oxide films, recommended practice calls for a light etching of the article between buffing and coloring operations since such chemical treatment removes embedded abrasive which, if allowed to remain, tends to produce surface discoloration during electrolytic oxidation.[6] Again, where organic finishes are applied, the work is frequently etched to produce a rough surface,[7] thus providing a foundation or "tooth" for the tenacious adhesion of either primer coat or finish coat.[8]

Etching may be performed as a separate operation employing a caustic soda solution,[9] or it can comprise an integral part of the alkaline cleaning treatment, depending on the alloy to be treated, its condition when ready for the etching bath, and the depth of etch required. Uniformity in obtaining a satisfactory etch is determined by the uniformity of the metal as well as by the suitability and uniformity of the alkali used as the etchant.[10] There are alkaline-type detergents with controlled, combined cleaning-etching action that produce effects similar to caustic.[11]

Where the caustic treatment is utilized, the solution is usually 10 per cent by weight, but it may be made stronger or weaker as desired. Work is immersed for ½ to 1 minute in the solution, which is maintained at a temperature of 150-180 deg. F. Should streaking develop upon drying, a second immersion in a 2 per cent solution of

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caustic soda either eliminates or minimizes this condition to a considerable degree.[9]

Immediately after etching, work should be rinsed in cold running water,[9] which is preferable to hot water since a cold rinse helps to avoid discoloration. If the time between etching and rinsing is kept at a minimum, more uniform drying of the work is obtained and the danger of staining is lessened.[6] Following this, parts are given a quick dip in a suitable acid bath to remove the dark smut deposited by the caustic treatment and to neutralize any alkali remaining on the surface.[9] Other suitable non-acid etchants used in preparing aluminum for finishing are mixtures of sodium hydroxide and sodium fluoride, and trisodium phosphate and sodium carbonate (used together or separately). Together they afford a mild cleaning action and produce a light etch. Unlike the caustic soda etch, the carbonate-phosphate etch is less rapid and the time or treatment is not so critical.[11]

Parts heavily soiled with grease or oil should, of course, be precleaned by suitable alkaline-presoaking, emulsion-cleaning or solvent-degreasing compositions[5] before etching.[8] However, where aluminum is not excessively covered or coated with foreign matter, etching and cleaning are frequently performed simultaneously in the same operation by the tank immersion method with the proper alkaline detergent solutions. Concentrations used and length of immersion depend on the requirements of the individual job, but generally 2 to 8 oz./gal. of material at 170-180 deg. F. are used to produce a uniformly etched, bright surface.[8] Too long an immersion period may result in smut formation, removal of which, in turn, will necessitate use of a suitable acid dip.[12]

Avoidance of attack on base metal is especially important in cleaning zinc die castings. Generally, this operation is quite critical, particularly from the standpoints of time and material selection.[8] The choice of cleaning procedure should be carefully approached since it has now been established with

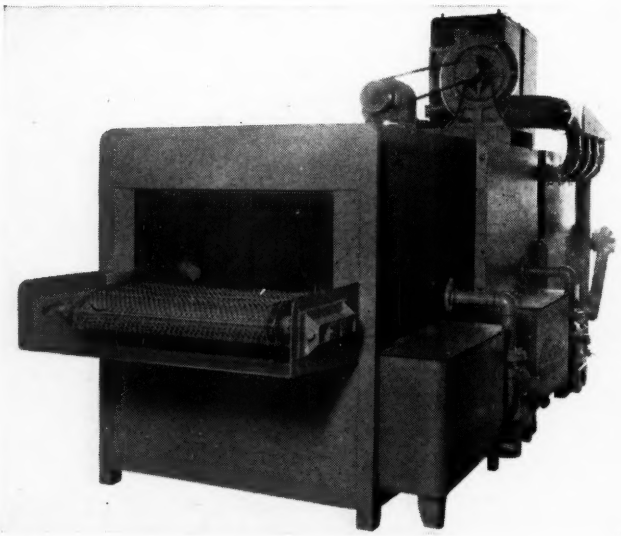

Fig. 3 — Illustration shows a combined washing, rinsing, and drying machine used for cleaning and drying die castings prior to assembly. The washer is a straight-through type featuring a wire mesh conveyor fastened by support rods to a steel roller chain. The solution tanks are heated with steam and the drying action is accomplished with gas heat.

(Photo courtesy The Alvey - Ferguson Co., Cincinnati 9, Ohio)

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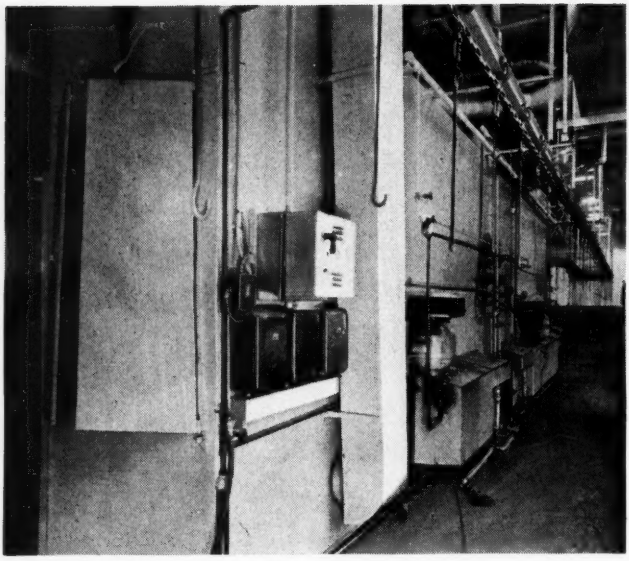

Fig. 4 — A monorail type mechanical washing machine for cleaning aluminum prior to painting. The installation has been so designed that the cleaning operation is performed while parts are being transported on the plant conveyor system. *(Photo courtesy N. Ransohoff, Inc., Cincinnati 16, Ohio)*

certainty that the formation of blisters in copper deposits on zinc alloy die castings can result from excessive alkaline cleaning.[8]

Cycle selection depends to a considerable extent upon the type of equipment available. A short sequence suitable for manual operation in still tanks is not satisfactory in a slow-moving conveyor unit where the cleaning time is frequently measured in a matter of minutes.[8] For cleaning zinc, as well as aluminum, there are available on the market today a number of excellent, specially designed proprietary cleaning agents[3] as well as performance-proved still-tank formulas that assure the successful application of these cleaners.[8]

Proprietary cleaners of the strongly alkaline types like those commonly used on steel are desirable for cleaning magnesium die castings. The milder formulations needed for aluminum are satisfactory in some instances; however, for best results, average practice indicates that the pH of the cleaning solution should be above 11. When used as a soak cleaner, the bath should be maintained preferably at boiling temperature. If the solution is operated below the boiling point, some form of agitation should be employed.[13] The immersion period depends, of course, on the type and degree of the oily matter on the surface; however, 5 to 15 minutes usually will suffice. A general rule for acceptable cleanliness is that the surface should not only be free from visible contamination, but also should be wetted with water. A break in the water film signifies insufficient cleaning. The immersion period should then be increased.[14]

Electrocleaning

The use of alkaline cleaners as electrocleaners has become increasingly common commercial practice in recent years.[3] Electrolytic cleaning is generally one of three types: cathodic cleaning (direct current), anodic cleaning (reverse current), or a combination of both methods.[15] The electrocleaning process affords a quick and thorough method for removing oils, greases, burnishing compounds, buffing and polishing compositions, and most oth-

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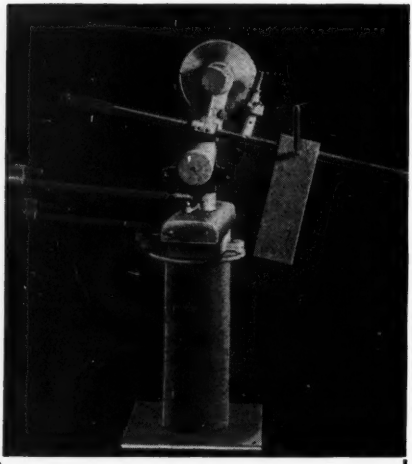

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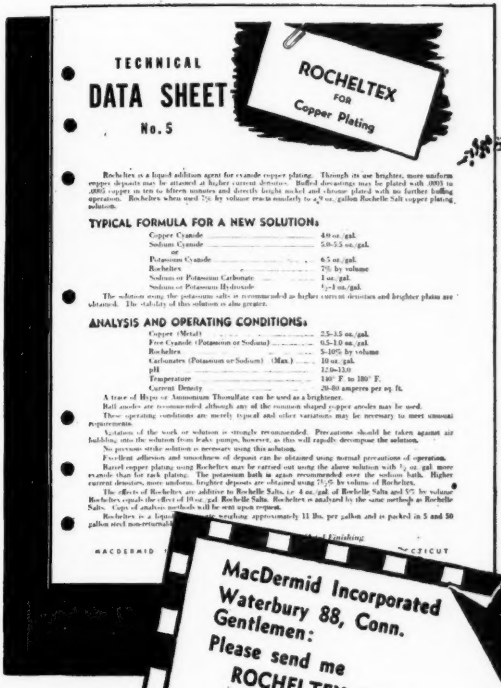
er deposits or soil. Where this method is employed, the metal castings are connected to electrodes and hung in water solutions of sodium silicates[14] or certain other specially compounded alkaline-base detergents[2] (which serve as the electrolyte) while an electric current, carefully controlled as to voltage and amperage, is passed through the bath.[16] In many instances, the work is made the cathode, while in a great number of other cases the castings are used as anodes. Some platers clean cathodically for a period of time and then reverse the current for a short time.[3] Thus, it is not uncommon for the casting to act as both the anode and cathode,[16] in which event the time of cathodic cleaning is normally from 4 to 6 times that of anodic cleaning.[3]

The cleaning cycle is extremely short, even heavy deposits being removed in a matter of a minute or so. Because of this short time, careful control of the immersion period should be observed since discoloration may result from excessive immersion. As insurance against uneven cleaning and against discoloration, cleaning operations should include a pre-soak. In addition to affecting the quality of the article, a pre-soak can effect economies by increasing the life of the cleaning material[2] or reducing the total cleaning time by as much as 50 per cent.[15]

The advantage of cathodic cleaning lies in the fact that copious gassing is obtained at the cathode—about twice as much as that obtained at the anode. A disadvantage lies in the fact that any metallic (and even non-metallic) ions present may be deposited when the work is the cathode. The advantage of anodic cleaning lies in the fact that the ions are traveling in the opposite direction, thus eliminating the danger of deposits. However, in some cases, there is an acceleration of the attack upon the metal by the cleaner.[13]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Sodium or Potassium Hydroxide ½-1 oz./gal.
The solution using the potassium salts is recommended at higher current densities and brighter plate are obtained. The stability of this solution is also greater.
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Copper (Metal) 2.5-3.5 oz./gal.
Free Cyanide (Potassium or Sodium) 0.5-1.0 oz./gal.
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Carbonates (Potassium or Sodium) (Max.) 10 oz./gal.
pH 12.0-13.0
Temperature 140° F. to 180° F.
Current Density 20-40 amperes per sq. ft.
A trace of Hypo or Ammonium Thiosulfate can be used as a brightener.
Roll anodes are recommended although any of the common shaped copper anodes may be used.
These operating conditions are merely typical and other variations may be necessary to meet unusual requirements.
Agitation of the work or solution is strongly recommended. Precautions should be taken against air bubbling into the solution from leaks pumps, however, as this will rapidly decompose the solution.
No previous strike solution is necessary using this solution.
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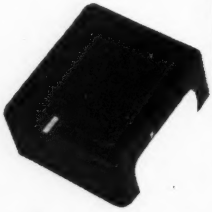
The cathodic cleaning-anodic cleaning combination cycle involves a preliminary cleaning for the major portion of the soil-removing process with the work as the cathode, resulting in maximum agitation on the surface of the parts to be cleaned. In the final phase of the cycle, reversal of the current, the work becomes the anode so that any deposits that may have formed during the cathodic step will be removed. It is claimed, also, that the reversal of current tends to still further loosen the soil from the surface of the work being cleaned and improves the rinsability.[15]

It is not possible nor practical to give definite preferred cleaning times and cycles that are universally applicable to all die castings, particularly aluminum and zinc, since these factors vary considerably, depending upon the amount of grease and the type and concentration of the cleaner, as well as on the subsequent finishing of the parts and their applications.[3,15] There are, however, various formulas that have been found unusually successful in average practice on numerous occasions.



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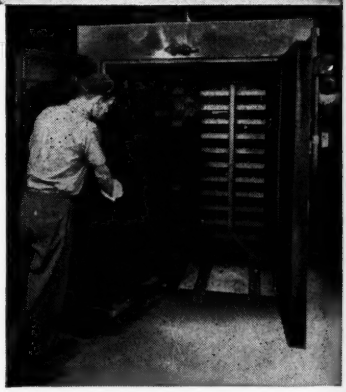

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DUST CONTROL SYSTEMS

For aluminum, compounds are available which are specially designed for electrocleaning. The material is used in a concentration of 4-8 oz. per gal. at a temperature of 160-180 deg. F., with a direct current of 10-20 amp. per sq. ft. Cold rinsing, acid dipping, and final rinsing of the work complete the surface preparation cycle.[8]

For zinc, reverse current cleaning with highly buffered cleaning compounds aids in producing bright adherent deposits capable of being baked at high temperatures without blisters or peeling when applied to buffed die castings under these specific operating conditions:[17]

Concentration ----------4-8 oz./gal.
Temperature --------180-200 deg. F.
Cleaning Time --15 seconds to 1 min.
Polarity ----------Reverse current (work as anode)
Current Density --15-25 amp./sq. ft. at 6 volts

Provided that the buffed die casting is reasonably clean with no chunks of greasy tripoli on it when the work reaches the plating room, the following typical cycle has been found to produce excellent results:[17]

1. Clean anodically, 6 oz./gal. cleaner for 30 seconds.
2. Cold water rinse.
3. 1-3 per cent sulfuric acid dip, 10 sec. (When longer acid dips are required, 1-3 per cent solutions of acetic, hydrofluoric or phosphoric acids may be employed.)
4. Cold water rinse.
5. Copper plate.

Work to be cleaned in this representative cycle should be precleaned unless it is buffed with a lime compound or very dry tripoli. The following precleaning methods are listed in the order of their efficiency:[17]

1. Spray pressure clean with proper alkaline material, ¼ to 1 oz./gal., 160-180 deg. F.
2. Spray and immersion in degreasing unit using filtered trichlorethylene.
3. Soak in recommended emulsion 3 per cent by volume plus 5 oz./gal. special alkali, 150-160 deg. F., 3 minutes or more.
4. Direct current clean in recommended electrocleaner, 4-6 oz./gal., 180-200 deg. F., 30 sec. to 1 minute.

A particularly effective method of removing heavily impacted dried buffing compound is to use a combination of Steps 3 and 1 above followed by the normal cycle of anodic cleaning as outlined in the typical treatment cycle first cited.

In general, it may be said that relatively strong alkaline cleaners should not be operated cathodically with strong evolution of gas for periods exceeding 15 seconds. For conveyor operation when the work has been completely degreased, simple immersion cleaning is often sufficient. In 99 out of 100 cases it appears necessary for the plater to work out through experi-

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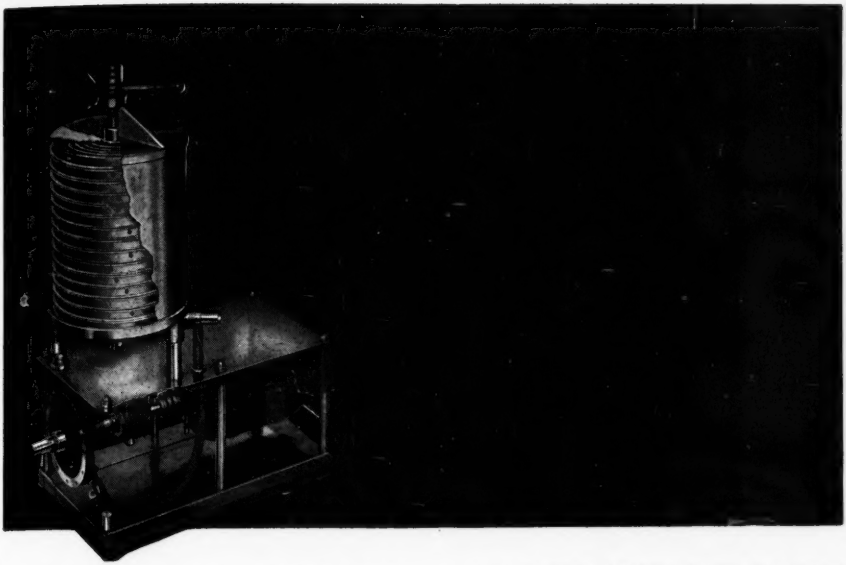

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As the liquid pressure in the filter is equalized all over, except where the discs touch the perforated screens, excess pressure cannot distort the internal parts or cause the liquid to pass through without being filtered. The entire surface and depth of each disc is used effectively to collect impurities and thus prevents surface sealing, and means longer disc life.

mentation, trial and test the permissible time for his particular operation. In doing this, care should be taken to avoid developing a practice which permits serious overcleaning. This condition is not always detectable by a change in surface appearance. If good adherence is not obtained in a reasonable cleaning time, the cleaner is at fault and extension of this time will not alleviate the trouble but merely aggravate it.[8]

For magnesium die castings, electrocleaning is not critical as is so often the case with aluminum and zinc die cast work. Used as an electrolytic cleaner, the alkaline bath may be made up of trisodium phosphate (4 oz.), sodium carbonate (4 oz.) and soap (0.1 oz.) to the gallon of water and operated at 160-180 deg. F. No agitation is required, since gas evolution tends to physically dislodge all oil and dirt. If the cleaning bath is to be used solely as an electrocleaner, the soap is sometimes omitted from the formula, since there is some evidence that it may collect as a gumming deposit on the anode.[13]

To operate the solution, the work is made the cathode and a direct current of 10-40 amp. per square foot of cathode area is applied for 1-3 minutes, or longer if necessary. Shorter distances between electrodes and higher operating temperatures will increase the cleaning efficiency of the process.[14]

Mechanical Washing Machines

Mechanical washing equipment employing emulsions, alkalies and oleum spirits also may be used to great advantage for precleaning purposes where a large volume of work must be processed preparatory to finishing and where the design and weight of parts permit.[7] Such equipment is in use in automotive plants.[18]

In the washing machine method, a conveyor carries the work to be cleaned through a series of chambers or tanks wherein a suitable alkaline solution is usually sprayed or flushed over the surfaces of the work with considerable force by means of circulating pumps. This spray action produces a mechanical scrubbing effect that assists the chemical action of the cleaner in removing all oil, grease or dirt from the surface.[19] Nuts, bolts and small pieces may be cleaned in a rotary drum washer. In another type unit, a

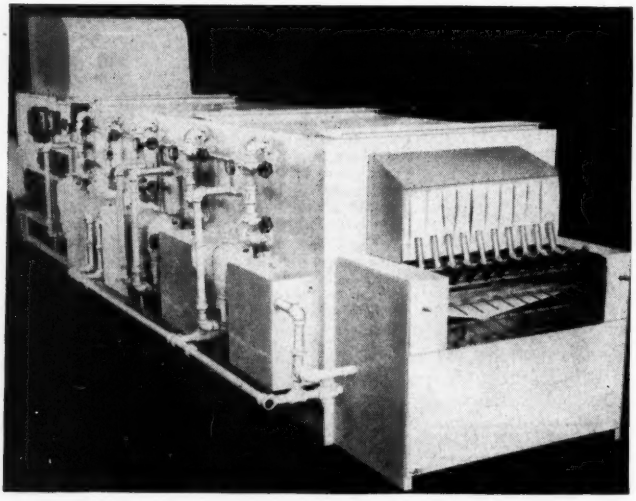

Fig. 5—A mechanical washer incorporating alkaline washing, rinsing, and drying operations is pictured herewith. Tho conveyor is a horizontal chain type with cross rods containing pins for processing tubular or cylindrical parts.
(Photo courtesy Optimus Equipment Co., Matawan, N. J.)

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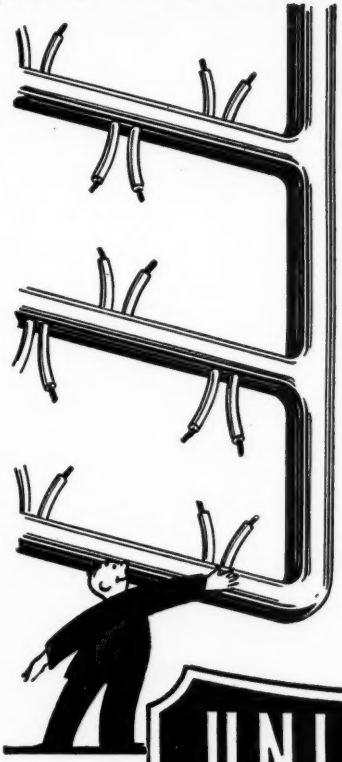

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large volume of cleaning solution is directed on the parts by means of paddle wheels or impellers.[18]

The time for the cleaning and rinsing operations usually runs about 3 to 5 minutes. The solutions used vary, depending on the individual job to be performed, however, generally about ½ to 1 oz./gal. of cleaner is used.[18,19]

Controlled by the operation of the machine, the cleaning cycle places rigid requirements on the cleaners used. They must be fast in their action to assure efficient soil removal; they must be effective at low concentrations to promote free-rinsing; they must be non-foaming; and, equally important, they must incorporate the ability to retard formation of insoluble scale deposits in the sprays and drains of the machine to enable the unit to provide its full mechanical cleaning action. Because of the general nature of this discussion, little can be said regarding specific materials, however, these essential characteristics deserve definite consideration in the selection of a cleaning compound for automatic washing equipment application. Specialized alkaline-type detergents are available from dependable supply sources.[2,5]

The design of any mechanical washer is dictated by the deposits to be removed and the cleaning procedure required. Any plant or shop considering the purchase of such equipment would find it prudent to consult with a qualified representative of a reliable manufacturer of cleaning compounds. Such a service engineer can provide detailed recommendations on the necessary steps to complete a satisfactory job. He can show the cleaning steps required and help in determining that the equipment will be satisfactory.[2]

Rinsing

Following alkaline cleaning by any of the methods outlined, parts should be rinsed. To obtain either physically

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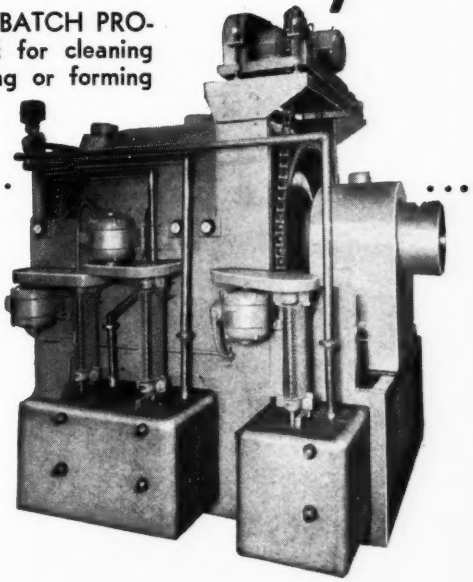

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clean or chemically clean surfaces prior to subsequent finishing, the importance of adequate facilities for rinsing after cleaning cannot be too greatly emphasized.[8] The final rinse step is the most important of the entire cleaning operation; on this point manufacturers of cleaning compounds are in general agreement.[2]

The quality of work obtained is determined to a large degree by the rinsing operation.[15] What good does efficient cleaning provide if an ineffective rinse leaves deposits of the compound to recontaminate the surface or, more important, loosened soil that has not been completely removed? A complete rinse removes all traces of soil and of cleaning material. It leaves the work as clean and neutral as the rinse water itself.[3] Alternate rinsing in hot and cold water is a frequently followed practice in connection with zinc die castings[2] and magnesium die castings,[14] while a cold, clear rinse is recommended for aluminum die cast work.[8,9] In most cases, however, says another authority, a hot rinse is preferable to a cold rinse, since most deposits can be rinsed more easily in hot water than in cold. In addition, parts rinsed in hot water dry quicker and are ready for the next production step in less time.[2]

Particularly where heavy or recessed castings are in production, the use of hot rinsing water is efficient practice. As much heat should be built up in such parts during the hot rinsing process as possible since any slight amounts of trapped water in the recesses will then be likely to dry out or evaporate completely before the work reaches the finishing processes.

In those instances where water-staining of work is objectionable, the final rinse must be with clean and soft water. Hard water must be avoided in cases where soap-containing detergents have been used, since hard water

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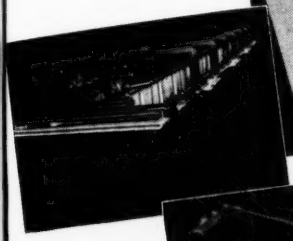

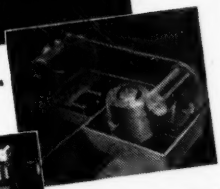

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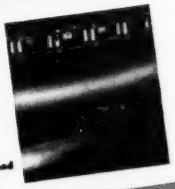

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and soap combine to form a scum on the work. Also, work coming from a hot soap solution must be immersed in the rinsing water without delay, before it has an opportunity to dry at any point. It is relatively easy to rinse away a soap solution while still wet; it is extremely difficult to remove a dried soap film.[20]

However, while a hot rinse is considered generally preferable to a cold rinse, it should also be realized that a free-flowing hot rinse is usually expensive to maintain and may be difficult to supply. It is important, therefore, where cold rinses are employed of necessity, that the rinsing operation be performed thoroughly and carefully, and that the rinse water itself be kept clean.[8]

Thorough rinsing is particularly important in processing zinc and magnesium die castings. On zinc surfaces that are to be electroplated or organic-coated, for instance, rinsing should be done very thoroughly. It is quite important that the last traces of alkaline materials be removed if maximum adhesion is to be obtained. This is best accomplished by alternate rinsing of the work in hot and cold water, followed by a suitable acid dip. As previously indicated, the use of a hot water rinse is strongly recommended since it avoids the possibility of entraining alkaline reaction products which are less soluble in cold water and affords greater opportunity for the release of any hydrogen that may be entrapped in the surface.[8]

Alkaline cleaning, whether electro or immersion, develops a thin film of alkaline zinc salts on the surface of the zinc which rinsing alone does not effectively remove. A major cause of blistering and peeling of electrodeposited coatings on zinc lies in the failure to provide absolutely clean surfaces. For this reason, a suitable acid dip invariably supplements cleaning prior to the electroplating or organic-finishing of zinc. If the cleaning treatment is to be followed by chemical pretreatment, however, this acid dip is not necessary.[3]

After zinc parts have been thoroughly cleaned and rinsed, they should be handled carefully with gloved hands. Perspiration contains chemical salts in solution that are excreted through the pores of the body and deposited on the metal wherever touched by human hands, thereby supplying the electrolytic medium to support galvanic corrosion. Subsequent paint coatings will blister in an exact replica of the fingerprint that was deposited on the metal. The alkaline cleaning treatment effectively removes any fingerprints that have been deposited up to that time.[4]

Where it is known that a zinc coating has been handled with bare hands subsequent to cleaning and prior to painting, it should be either recleaned in the alkaline bath or wiped with a

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clean alcohol-saturated rag. The person doing the cleaning should wear gloves. Alcohol, preferably with the addition of a little water (5 per cent), is a solvent for the salts deposited from the perspiration. Lacquer thinners, cleaning naphthas, and so on, should not be used for removing fingermarks since they are not solvents for the salts.[4]

In the chemical treatments applied to magnesium for surface protection, decoration, or both, final rinsing must be carried out very thoroughly to avoid contamination of the chemical treatment baths immediately after the alkaline cleaning. For instance, adherent soap carried over into an acid bath will form an oily layer on the surface of the bath. This oily film contaminates the work upon immersion in or removal from the tank.[13,14]

To maintain the rinse water in as contamination-free a condition as possible, the tank should be continuously overflowed. A suitable method involves the introduction of fresh water at one end of the tank by means of an inlet pipe extending well toward the bottom of the tank and the use of a weir or box overflow at the other end. With this arrangement, the surface is continuously skimmed and the entire rinse solution is kept relatively free from contamination. Rinse water temperatures are usually held between 180 and 212 deg. Fahrenheit, to provide for maximum rinsing action and efficiency.

In rinse tanks, as in cleaner tanks, heating coils should be installed on the sides of the tank at the back, or, if possible, away from the overflow since this arrangement affords maximum agitation of the solution and does not interfere with the skimming action of the overflow. If steam jets are employed, they should be directed toward the side of the tank opposite the overflow.[15] Water jets, in addition to the main water inlet, may be similarly employed.

In next month's issue of PRODUCTS FINISHING acid dipping techniques and chemical coating procedures will be outlined.

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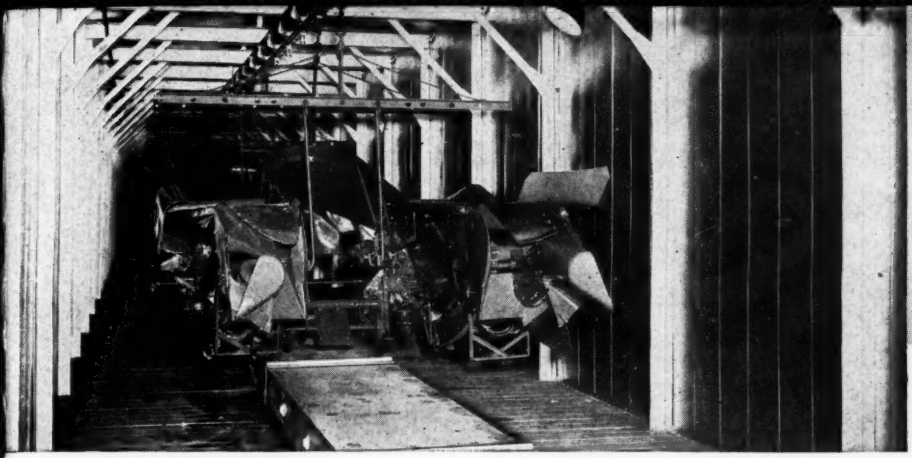

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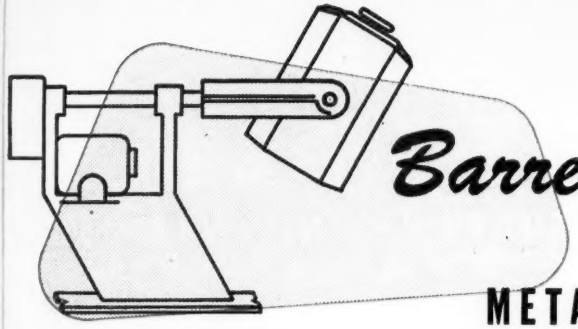

Barrel Finishing of METAL PRODUCTS

Part 24—Concluding The History of The Development of Barrel Finishing Materials

By H. LEROY BEAVER
Barrel Finishing Consultant
Lansdale, Pennsylvania

LAST month we discussed with you the original application of round steel balls in barrel finishing practice, attributing their first use to Edmonds in England sometime prior to 1901 which is the earliest date of their aplication that we have been able to uncover. Next in line of application we find in the period from 1912 to 1915 inclusive a record of two patents that take us from the realm of round balls.

Like so many others, your author has always liked to feel that we have been responsible here in this country for the development of just about everything that was new that has been applied to this field of metal finishing, but we are learning that just as much thought has been given abroad to the same problems that have beset us. Even the tyro in experience must recognize that a round ball as a burnishing piece lacks much that would be desirable, and that something was required that would reach into and burnish grooves and angles where round balls could not go. The first development to attain this end was in a conical form.

We have outlined for you the conception of Edmonds in the adoption of the steel ball. Also in England there were operators who recognized the deficiencies of round balls and among them was one Wenger who in 1912 was issued a British Patent bearing the number 29418. The preamble of the Wenger patent reads as follows:

> "We have realized that in the said process the steel balls could be replaced by other polishing bodies of polished steel which can easily slide and which will present no sharp edges, such for example as lens—shaped pieces with rounded edges, cones of polished steel having a rounded apex and base, double cones having rounded apices and periphery, and cylinders having rounded ends."

From our rather more than voluminous archives, we are reproducing for you an illustration made from a photo-

static copy of the illustrated sketch accompanying the Wenger claims.

Descriptive of the patented forms it is stated that,

"Figures 1 and 2 are a section and a plan respectively of a polishing body in the form of a lens with rounded edge.

Figure 3 is an elevation of a polishing body in the form of a cone having its apex and its base rounded.

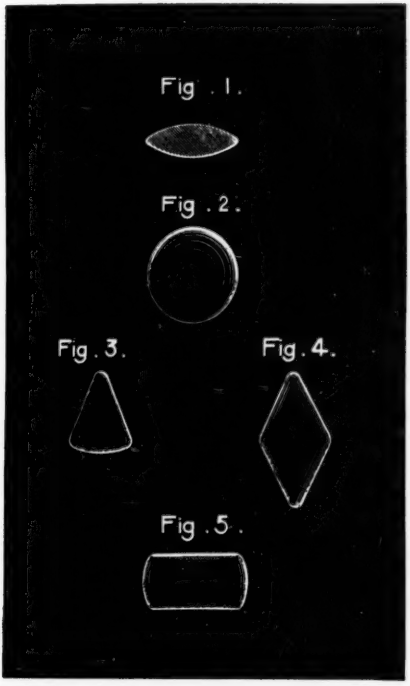

Fig. 1—Illustration shows sketch submitted in support of the Wenger claims.

Figure 4 is an elevation of a polishing body in the form of a double cone having its apices and its periphery rounded, and

Figure 5 is an elevation of a polishing body in the form of a cylinder with rounded ends."

Now it will be appreciated that none of these forms could have been cold headed as are the most of the currently produced barrel finishing materials,

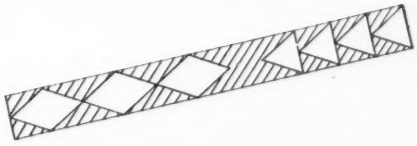

Fig. 2—Drawing indicates how material was wasted in the manufacture of single cones and double cones from rod stock.

but were turned from rod stock, with an enormous waste of raw material, indeed enough material between each two pieces so formed to produce a third piece by present day processes.

We have never had a copy of the complete Wenger Patent reciting all of its claims, but it is quite obvious that the intent of the inventor was to develop one or more forms of barrel finishing materials that would supply the deficiencies of the then exclusively used round burnishing balls. It is interesting too in checking back to note that this material came into our possession back in 1927.

The next succeeding form of development of a steel burnishing material other than round balls came in 1915 with the issuance to Thomas A. DeVilbiss of United States Patent 1,133,368 dated March 30th, 1915, but in the intervening period from the Wen-

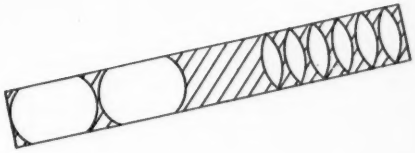

Fig. 3—Schematic drawing indicating method of manufacture of lens shaped forms and rounded end cylinders by turning from rod stock.

ger patent of 1912 to the DeVilbiss of 1915 we have the record of still another development for which no patent application ever was filed. This development was by a single New England manufacturer whose name we are not privileged to disclose, and it is the only

Fig. 4—Illustration shows two Pin-Ball burnishing shapes.

case where we have ever seen this particular form used. Designed for a very special purpose which it filled admirably, it was variously described as a "Pin-Ball," a "Ball-Pin" and again as a "Rod-Ball." In order that you might better note the actual appearance of the Pin-Ball, we are illustrating two of these burnishing pieces in Fig. 4. Like the other early developments, they have been turned from the rod material and with an equal consequent waste of raw material between each part.

Coming back to the DeVilbiss Patent, the original claim was filed in March 1914, and it is interesting to note that heading the illustrated sheet of the Patent the parts are described as "Polishing Element for Rattling Devices." Even as late as this date, 1914, the relation to the barrel finishing picture of Foundry Rattler vs. Burnishing Barrel had not been completely defined, and much of the barrel finishing thought as well as procedure was based on operating barrels for burnishing identically as the foundry rattler was operated. It can be easily seen that this resulted in no little confusion, to say nothing of battered and deformed parts. It is not too unusual for us to still receive inquiries as to whether or not a currently operated foundry barrel might be by some process converted to present day barrel finishing use. The answer to this, quite generally, is, "no"; that is, as respects the use of polished steel burnishing materials operated with a burnishing soap solution for lubrication, but it is quite possible to make such adaptations so as to use fractured minerals or either Danish or French Pebbles in the roughing out of parts such as castings and forgings preliminary to the final or finishing operations on such parts.

The illustrations of the conception of Thomas A. DeVilbiss of the various forms covered by his patent are interesting, and for that reason we are illustrating in Fig. 6 the first or engineering page of the patent.

It has been said that DeVilbiss derived his conception of this or rather the various burnishing pieces covered by his patent basically from a string of elongated beads, which might well be true, for they would have that general appearance. We have no pieces in general use at this time that follow very closely the DeVilbiss conception unless it might be what is termed an "Oval-Ball" developed from this research, but which is more largely applied as the ball section of pocket book frame clasps rather than as barrel finishing material.

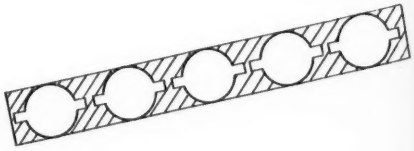

Fig. 5 — Drawing shows material usage in manufacturing Pin-Balls from rod stock.

The next development of forms other than round balls was by George E. Abbott of The Abbott Ball Company in what was termed the "Abbott

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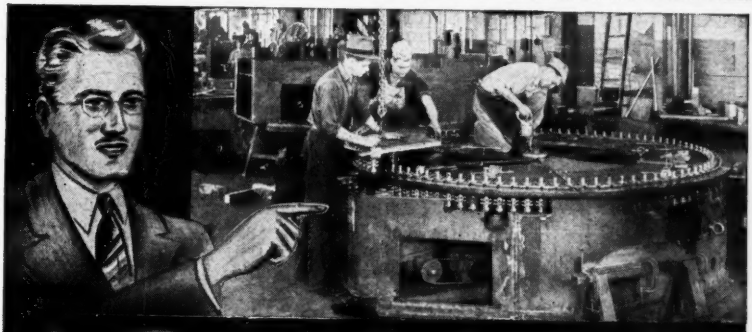

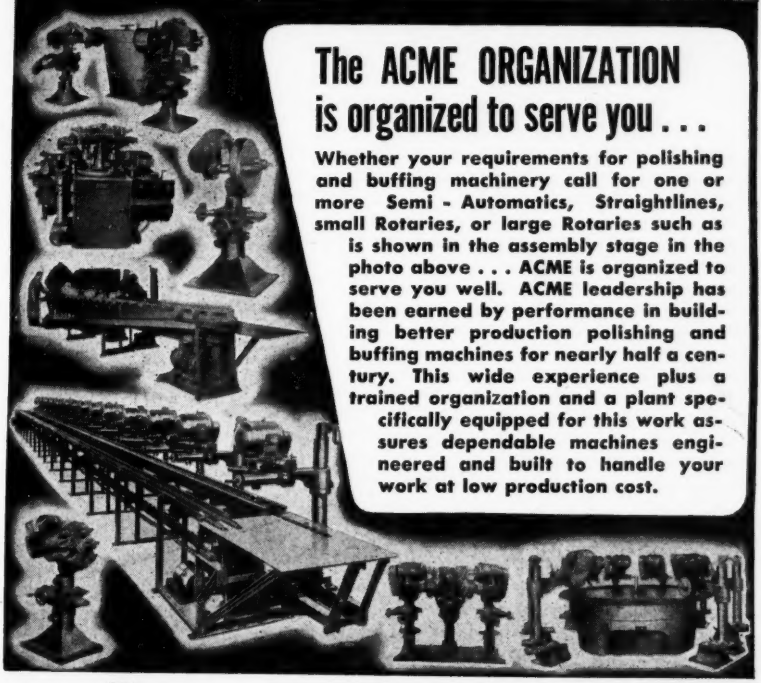

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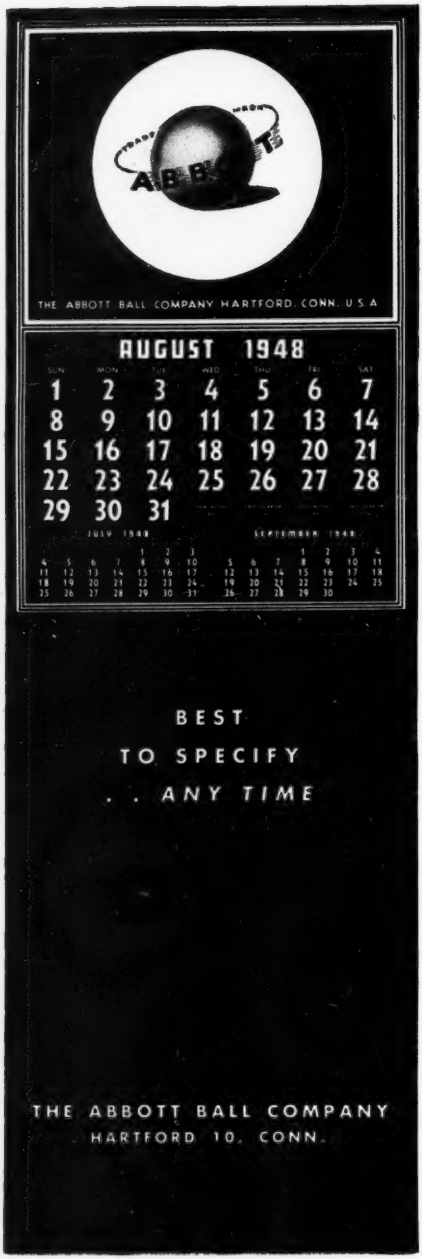


Cone." This form in reality is a double conical form bisected by a flange at its equator and tapering towards both ends, substantially as shown in Fig. 7. Quite unlike the Wenger Double Cone, which was turned from rod material, the Abbott Cone is formed between

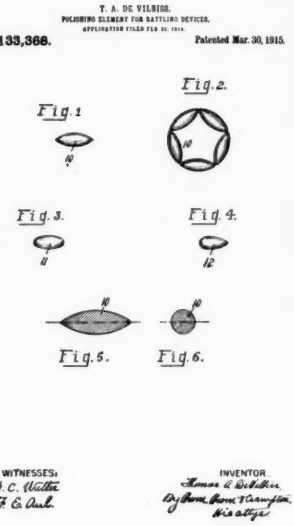
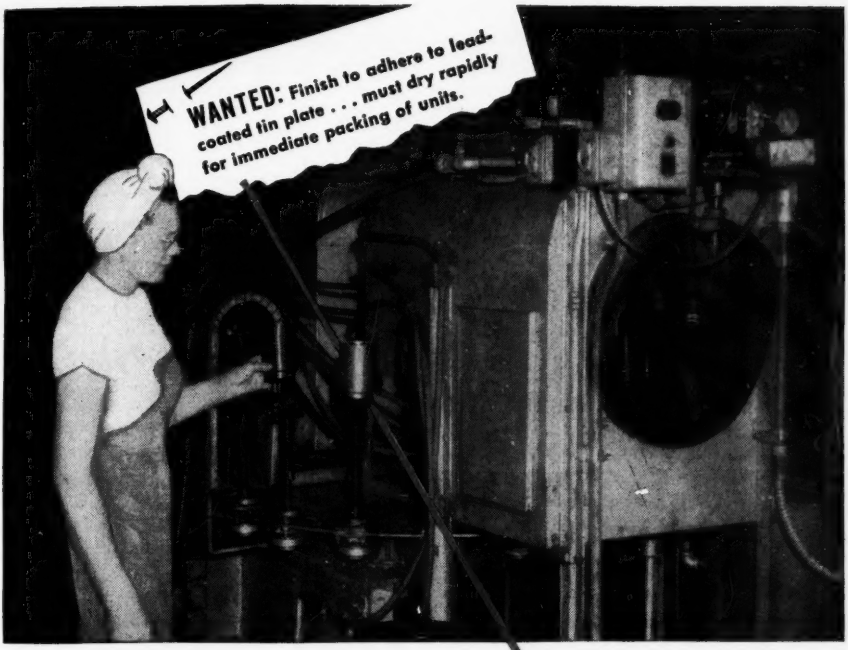

T. A. DE VILBISS.
POLISHING ELEMENT FOR BUFFING DEVICES.
APPLICATION FILED FEB. 20, 1914.
1,133,368. Patented Mar. 30, 1915.
Fig. 1
Fig. 2.
Fig. 3.
Fig. 4.
Fig. 5.
Fig. 6.
WITNESSES:
INVENTOR.

Fig. 6—Illustration shows the first page of the DeVilbiss patent on burnishing forms.

dies, is far more uniform when finally finished and shows no tool marks. This cone when first produced was given what might well be termed a "tough" series of tests on a wide variety of parts of various materials to, as George E. Abbott explained to us, "iron out any bugs" that might be in it. On some of the lighter parts there was evidence of deformation of the parts in process and from this he concluded that the parts as formed, and when operated alone were "too harsh," and for a long time his recommendation was to use equal parts of round balls and cones to avoid deformation. That was before either of us had learned that distor-



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tion or deformation of parts in process is not caused by the shape of the part or the load factor, but almost invariably by excessive barrel speed. To prove this point we experimented with loads of solid cones and on a wide variety of pieces. At high barrel speeds distortion was present but at low speeds absent, which seemed to effectively prove the point. Many barrels are operating today on loads of cones only and with most satisfactory results.

Fig. 7 — The Abbott Cone burnishing shape

The next in line of introduction was a part, cold headed as was the Abbott Double Cone developed from our own research and which we termed a Balcone, signifying that it was a combination of Ball and Cone. This was in July, 1927, and prior to the time that we realized the importance of the regulation of the control of the speed of the barrel. The reasoning was that if a double cone was too "harsh" and that a mixture of balls and cones was necessary, why not incorporate them into a single piece, making one end represent one-half of a ball and the other end one-half of a cone, bisected by a flange around the equator of the piece, substantially as shown by Fig. 8.

Fig. 8—The Balcone burnishing form

Following this the next development was also from our own research and came in November 1927. Realizing that round balls as such offered the least resistance in a burnishing mass, and that more rather than less resistance was required, we conceived the idea of producing a ball form bisected at its equator with a projecting flange to provide for greater resistance within the mass to parts seeking to pass through that mass, and this part we termed a Finbal due to its general appearance of a ball with a projecting fin as shown in Fig. 9.

Fig. 9 — The Finbal burnishing form

The next development came in February of 1928 with the introduction of a diamond-shaped part which we termed a Diamonstel. These were and still are produced in two sizes, $\frac{1}{8}$ x $\frac{3}{16}$ and $\frac{1}{8}$ x $\frac{1}{4}$ inches. Originally they were developed for the removal of burrs from drilled holes in a brass ball cage for a small radial ball bearing. They were hardened and polished to a high luster identically as burnishing balls are finished, but their use in this hardened form as a shape for the removal of burrs was not too successful. Our research had not progressed far enough for us to learn that hardened and polished balls are not successful for burring, but that dead soft annealed forms are, and when we shifted from hard to soft materials in this form the results were immediately evident. This experience as well as succeeding ones is the basis on which we have repeatedly recommended in this series of discussions that only soft annealed barrel finishing materials should ever be used in burring or deburring procedure as it is variously

Fig. 10—The Diamonstel burnishing shape

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termed. The Diamonstel is illustrated in Fig. 10.

While this research in its thirty-five years has developed many things insofar as steel burnishing materials are concerned, we have departed somewhat from the true chronological order to leave the best development for the close of this discussion. This development came in March 1927 in the form that we termed a "Diagonal" due to the fact that the parts themselves simply represent a round form cut diagonally at an angle of 45 degrees, substantially as illustrated in Fig. 11. This Diagonal form we consider to be the best and most efficient piece that has come out of this research down to this date. Diagonals have proven their efficiency and worth in hundreds after hundreds of cases, and we know of no operator who has once used them who would be agreeable to returning to any other present form. During these series of discussions we have referred to many operations, but insofar as our own actual operations were concerned all of our tests were made using diagonal steels.

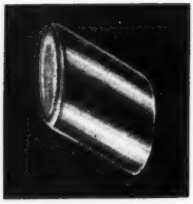

Fig. 11—The Diagonal burnishing form

With the exception of burnishing pins which we do not use in any form and which we consider as being of little or no consequence in the barrel finishing picture, this provides the background coverage of the steel barrel finishing materials in use and their origin. However, it is not to say that this spells the end of the development of formed pieces for use in barrel finishing operations, for we have been commissioned by one of our foremost manufacturers to develop two other forms which we have long had in mind. The work on these is now going forward and preliminary tests show a very great deal of promise.

Fiftieth Anniversary Booklet. In commemoration of its 50th anniversary in the plating and polishing machinery manufacturing field, the Chas. F. L'Hommedieu & Sons Co., 4521 Ogden Ave., Chicago, Ill., has published a booklet portraying the advancement of the company from its establishment in 1898 up to the present year. Copy is available to interested executives upon request.

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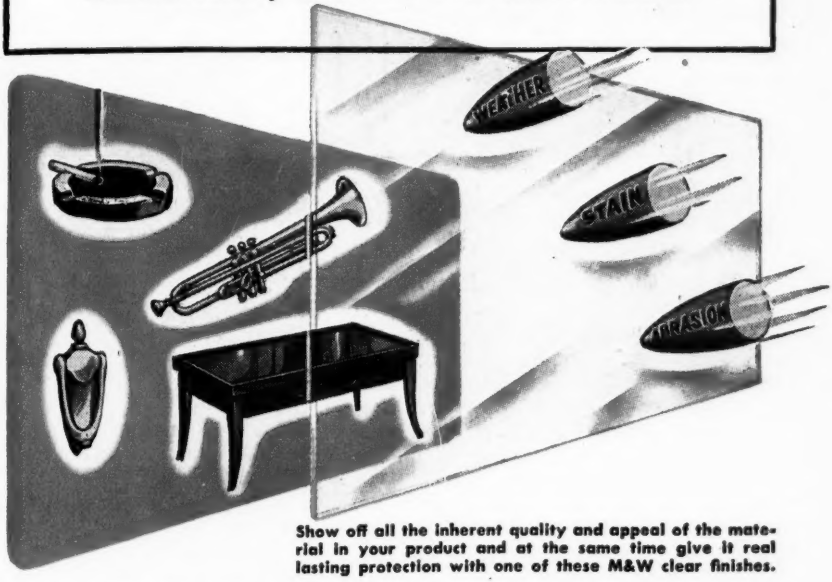

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Recent Developments in Surface Finish Measurement

THERE is evidence that interest in selection, specification and measurement of surface finishes is on the upgrade in the metal-working industry. Discussing the aspects of surface finishing measurements, from the instrumentation side, in a recent issue of "Instruments" (April 1947), J. A. Broadston expressed the opinion that great opportunities now exist for those who desire to increase the utilization of present-day instrumentation methods in controlling the surface quality of products whose performance depends to some degree upon proper surface finish. Thus, according to Broadston, surface quality control today lags far behind existing instrumentation primarily because many production men do not realize that this instrumentation is no longer a laboratory curiosity, but has grown up to the point where it can offer tangible help.

It is generally recognized that the surface of all materials finished by grinding, milling, turning, planing and other methods is composed of countless tiny irregularities. These irregularities completely cover the surface and form a mat, which, to a large extent, determines the appearance and suitability of the surface. It has been said, and for many parts it is true, that the quality of the surface finish may have a far greater influence upon the life and proper functioning of a part than either its composition, strength, or dimensions. Since adequate controls are set up for these latter properties, it seems reasonable that proper control of surface finish would, in many instances,

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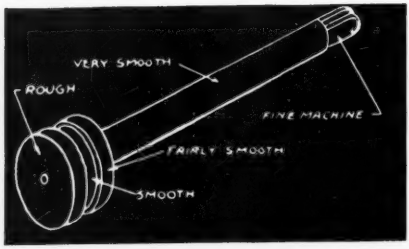

Fig. 1—Typical designation of surface finish based on descriptive terms
(Illustration courtesy "Instruments")

be, unless it can be finished at the same time another adjacent surface is finshed, or unless the only means of sizing will actually produce a smooth surface. Thus, from an economic standpoint rougher surfaces generally cost less than smooth ones; as a result, the important point is to determine which surfaces are critical and which are not. The adaptation of a proper drawing notation which will point out those surfaces of a part which need special care in finishing, and those which can be allowed to remain rough will, in many instances, reduce costs by preventing misapplication of effort.

Illustrated in Fig. 1 is a designation of surface finish requirements based on descriptive terms, and in Fig. 2 is shown a surface finish designation for the same part, based on microinch values obtained with a tracer point analyzer, which is one type of instrument used in surface quality control.

It has been stated that surface point analyzers have contributed more to the advancement of surface quality control than any other single factor. The Profilometer, manufactured by Physicists Research Company of Ann Arbor, Michigan, and the Brush Surface Analyzer, manufactured by the Brush Development Company, Cleveland, Ohio, are tracer point surface finish measuring instruments. The specific quality measured by the profilometer type instruments is roughness, which, together with waviness and flaws are generally supposed to comprise the irregularities found on a surface. The instrument uses an electric "pickup" to trace the irregularities and to convert these mechanical fluctuations into corresponding electrical ones. The instrument amplifier then magnifies these fluctuations until they are powerful enough to actuate a meter. The meter reading thus produced presents the average surface roughness of the part being measured. The reading produced by the Profilometer can be described as the average departure from the "center line." That is, the surface to be investigated should be pictured as a series of hills and valleys and a center line should be drawn halfway betweeen the peaks and valleys—the Profilometer reading represents the average distance between the center line and the line de-

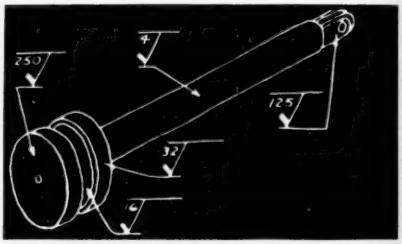

Fig. 2 — Surface finish designation based on microinch values obtained from a tracer point analyzer type of instrument
(Illustration courtesy "Instruments")

noting the surface. For example, the curve in Fig. 3 represents a surface profile, highly magnified.

On the basis of horizontal spacing, surface irregularities may be grouped into three classes: surface flaws,

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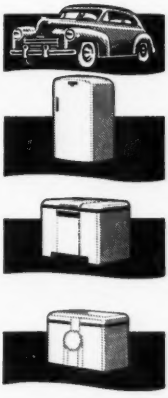

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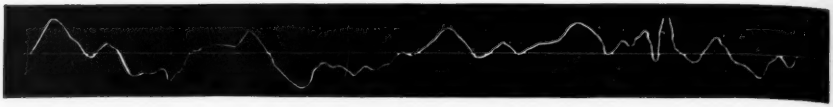


Fig. 3—A surface profile, highly magnified
(Illustration courtesy Physicists Research Co., Ann Arbor, Mich.)

waviness, and roughness. Based on data supplied by the Physicists Reseach Company, Ann Arbor, Michigan, these three classes may be defined below as the B-46 Committee of the ASA describes them.

Surface Flaws: irregularities of any sort which occur only at one place or at relatively infrequent and widely varying intervals on the surface. Examples are scratches, ridges, holes, peaks, and cracks.

Waviness: a pattern of surface deviation consisting of recurrent or random irregularities on a surface in the form of waves. On smooth machined surfaces, the length of such waves ordinarily measures between 1/32 and 1 inch.

Roughness: recurrent or random irregularities on a surface more closely spaced than waviness. Roughness may be, and ferquently is, superimposed on a wavy surface. On smooth machined surfaces, the distance between high spots of such irreguarities is ordinarily between 0.0002 and 1/32 inch. The height of these irregularities is much less than their width—generally between 0.000001 and 0.0005 inch.

Microinch. Roughness of a surface is measured in inch units. As the irregularities to be measured are very small, the inch is too large for convenient use. For this reason the miroinch has come into general use, where one microinch equals 0.000001 inch.

Root-Mean-Square. The readings produced by the profilometer type of instrument represent the root-mean-square value or average of the roughness. The root-mean-square (rms) is a common type of average in electrical measuring. Shown in Fig. 4 is a portable type profilometer comprising the basic unit for measuring surface roughness in microinches.

The Brush Surface Analyzer is

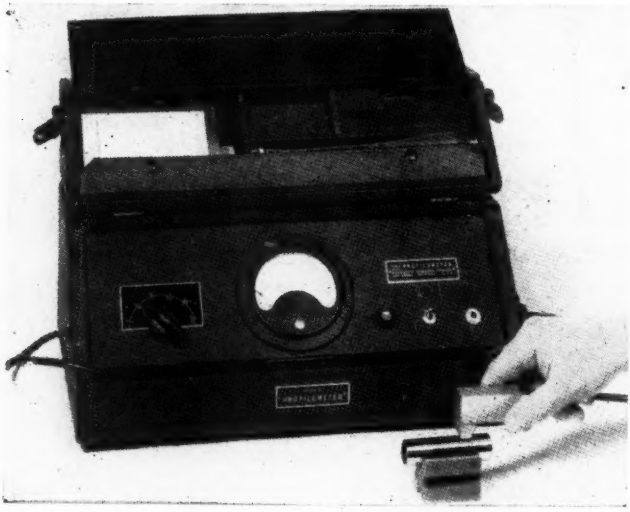
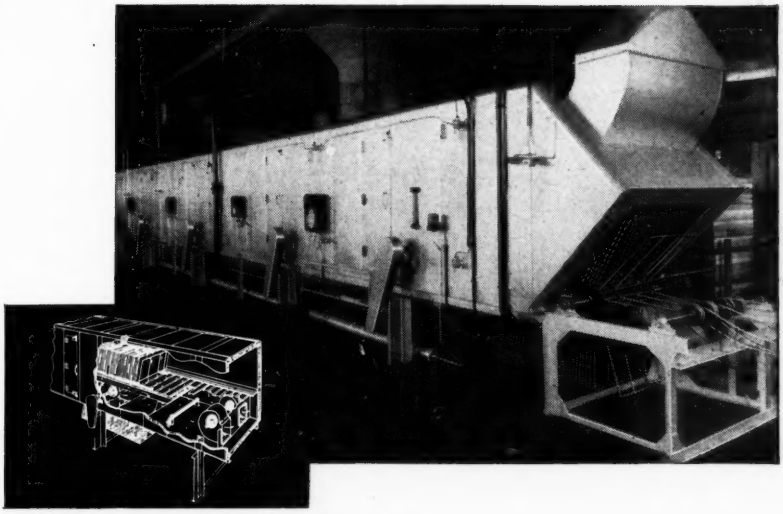


Fig. 4 — One type of profilometer for measuring surface roughness
(Photo courtesy Physicists Research Co., Ann Arbor, Mich.)



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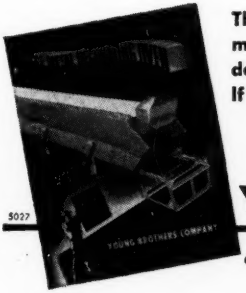

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Fig. 5—The brush surface analyzer for measurement of surface roughness (*Photo courtesy Brush Development Co., Cleveland, Ohio*)

another type of surface point analyzer, which, according to the manufacturer, the Brush Development Co., Cleveland, Ohio, has been used for the exploration and charting of surface finishes on metals, glass, wire, plastics, paper, plated and painted surfaces, and tool cutting edges. A commercial Brush Surface Analyzer is shown in Fig. 5. One application of the Brush Surface Analyzer to plated and unplated surfaces was brought out as part of a paper presented by R. D. Miller and A. H. Du Rose at the 1947 Annual Convention of the American Electroplaters' Society at Detroit, describing studies on the evaluation of the buffability of nickel deposits (see also Proc. American Electroplaters' Society, 1947). Figure 6, taken from the above work of Miller and Du Rose shows a surface chart of a steel surface before and after nickel plating. It was reported that the surface analysis charts were obtained on steel panels which had been polished on a 180 grease wheel and then scratched with a needle.

The Comptor Surface Finish Comparator, manufactured by the Comptor Company, Waltham, Mass., is a reflectivity type of comparator for studying surface finishes. It is equipped with a light source and a photoelectric cell which measures the light reflected from the surface to be compared with the sample. The meter reading serves as an index to the surface roughness. It is reported that this type of instrument is particularly effective on fine finishes such as produced by grinding, lapping, honing, and so on. Readings are instantaneous and the instrument can be used either for minute inspection of designated spots or for rapid and complete scanning of a whole surface.

Many production men have found the use of sets of standard surface finish specimens to be adequate for shop control of surface finishes. There are several types available and any of these which appeal to the user can be used in such a program. One standard set of surface roughness specimens, manufactured by the General Electric Company, contains plates showing 10 degrees of roughness with a total of 25 different finishes. The use of surface replica standards has the advantage that their lower cost permits a wider distribution; thus, it is easier for all personnel to check conformance with

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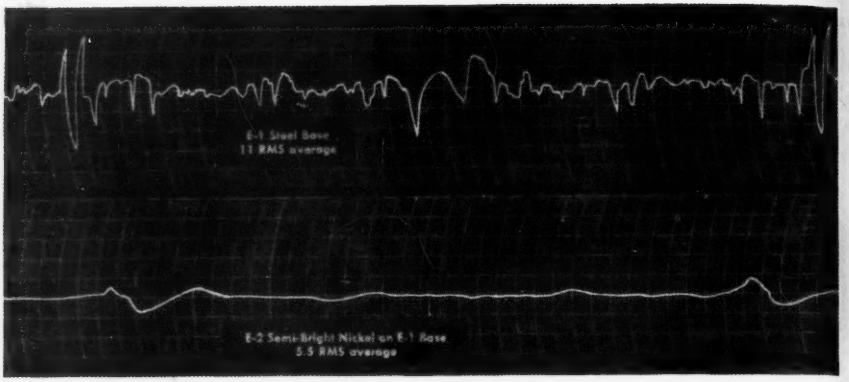


Fig. 6—Surface analysis charts of steel surfaces before and after nickel plating *(Illustration courtesy Proc. Am. Electroplaters' Soc. 1947)*

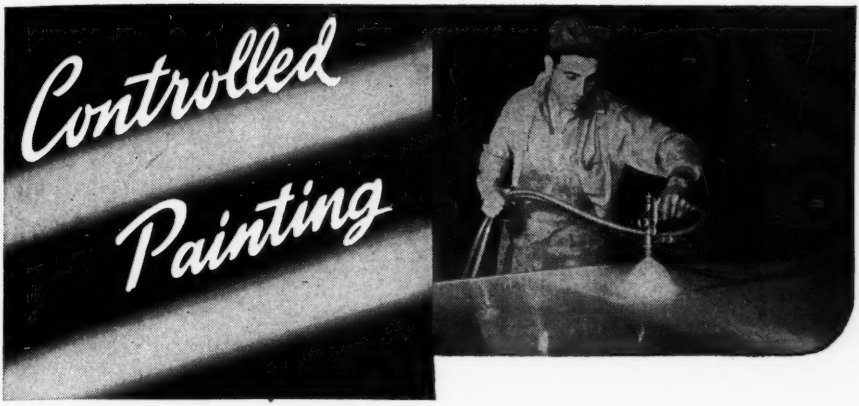
surface finish requirements and specifications.

Because of the widespread interest and importance of the subject of surface finish the National Bureau of Standards has investigated the application of nearly transparent surface replicas for evaluation of metal surface finish. This study has resulted in the development of a method for evaluating the finish of a surface through the medium of a properly prepared replica of the surface (see also J. of Research, Nat. Bur. of Standards, Jan. 1945, RP 1625). In the method, the replica is prepared by applying a suitable solvent to the metal surface, after which a clear plastic film is pressed on. The solvent softens the side of the film adjacent to the metal surface being examined, and permits it to flow and conform under pressure to the minute surface irregularities.

Examination of replicas so produced showed that the degree of transparency decreased with increased roughness of the original surface, and the rougher the metal surface, the more pronounced the variations in the geometry of the reduced patterns became. This led to the development of an apparatus for evaluating surface roughness based on the degree of variation of the geometric characteristics in a nearly transparent surface replica. This method, illustrated in Fig. 7, consists essentially in passing a narrow beam of light transversely through the moving replica.

Variations in the geometric character of the film, which are associated with roughness of the reproduced metal surface, control the intensity of the light passing through the film and thereby reaching the photoelectric cell at any particular instant. Fluctuations of intensity of the transmitted light cause a pulsating voltage in the cell circuit which is recorded by an electronic voltmeter. Voltage thus increases with an increase in the degree of surface roughness.

Some of the salient features attributed to the replica method are: (1) easy maintenance of a permanent record of a metal surface finish; (2) rapid average evaluation of a considerable length and width of the surface at one sitting; (3) simplicity of operation; (4) absence of the personal factor; (5) preservation of the surface, even for metals such as lead or tin-base bearing metals; and (6) availability of the method, since the replica may be



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ported to the location of the anaylzer. In addition, it is reported in the Bureau of Standards work that the method is especially sensitive to small changes in surface roughness for the finer grades of metal finish.

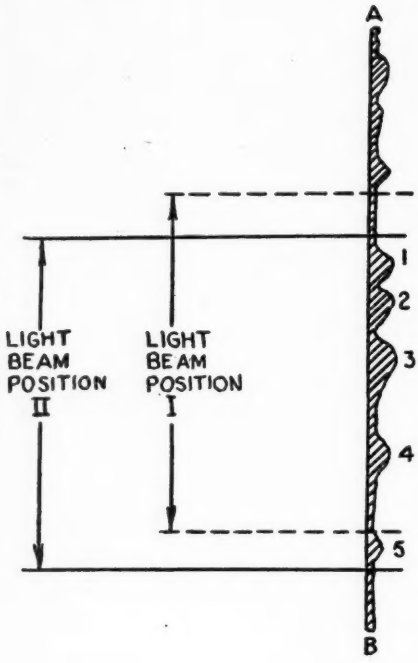


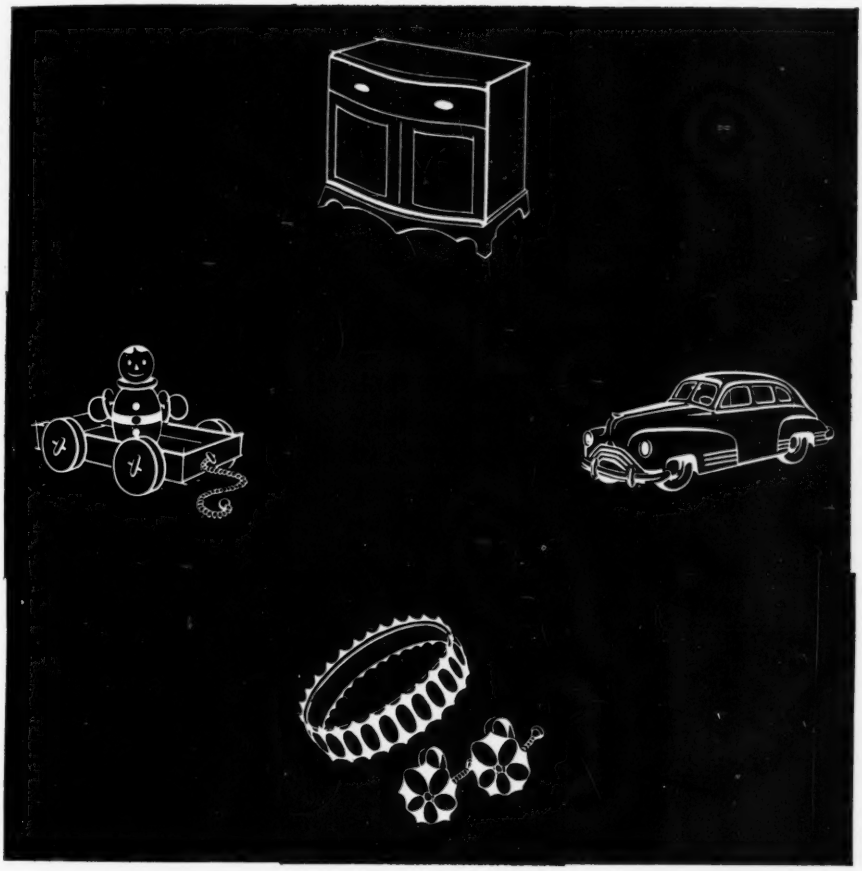
Fig. 7—Changes which occur in intensity of light transmitted through a moving replica (*Illustration courtesy National Bureau of Standards, Washington, D. C.*)

* * *

Future Trends in Alkyd Resins for Protective and Decorative Coatings

THE group of alkyd resins is recognized as one of the most important and widely used type of synthetic finish for metal products. The resins serve as major ingredients of both air-drying and baking finishes, suitable for inside and outside exposure. An alkyd resin is a polymeric product obtained by reacting a polyhydric alcohol with a polybasic acid. In practical use, the term has been extended to include resins which are modified with monobasic acids or monohydric alcohols. The most common example of the general process is the reaction of glycerol with phthalic anhydride, giving rise to glycerol phthalate. Other polyhydric alcohols such as ethlyene and diethylene glycols, pentaerythritol, and the like may be cross blended with glycerol or used alone. Likewise other dibasic acids, such as adipic, succinic, maleic, citric, and sebacic can replace phthalic anhydride as a constituent.

The distinctive position of the alkyd resins in the metal product coating field has been attributed to a number of reasons. Severe tests have proved that alkyd enamels exhibit good resistance to water, chemicals, and gasoline. Many forms of commercially available alkyd resin finishes have proved themselves to be outstanding in retention of gloss and color after exposure, and their durability has been found to be excellent. This general type of synthetic, in all its variations, has proved so versatile that it now appears in architectural finishes, coatings for transportation equipment, and enamels for general household and office metal fixtures. Increase in alcohol, perspiration, and oil resistance in coatings produced from phenolic modified alkyds has prompted their use upon metal chairs, desks, filing cabinets and similar applications. Various types of alkyd combinations have found innumerable uses for protecting and beautifying exterior metal objects, such as trucks, pumps, signs and others where their inherent beauty in enamels and their excellent baking properties, combined with flexibility, toughness and color retention have



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created wide markets for their use.

Some future advances that may be expected for alkyd resins in protective and decorative coatings were recently brought out by Zeno W. Wicks in the "Interchemical Review," published by the research laboratories of the Interchemical Corporation. Some of the current trends and future expectations of interest to finishing engineers are as follows:

(1) **More Careful Formulation.** It has frequently been the practice in the past to use high excess of glycerol—up to 30 per cent over the theoretical amount, especially in preparing short oil alkyds. This excess is being decreased, principally with a view to increasing the water resistance of alkyd resin films. Other improvements in formulation, along similar lines, are being made continuously.

(2) **Wider Use of Highly Polyhydric Alcohols.** Pentaerythritol is assuming greater importance, and it is predicted that this trend may be expected to continue. Because of the cost factor, frequently these higher polyhydric alcohols are, and will be, used with oils resulting in mixed alkyd resins. New polyhydric alcohols are widely sought for by resin chemists. Such an alcohol should have more than four hydroxyl groups, preferably all primary, and these should constitute a high percentage by weight of the entire molecule. A melting point below 250 deg. C. is desirable in order that the reaction temperature need not greatly exceed this point.

(3) **Polybasic Acids Other Than Phthalic.** Investigation is being carried out in this field. Maleic and sebacic acids can be expected to increase in application. Maleic condensates also are being more widely used.

(4) **Fractionated Fatty Acids.** It has been recognized for some time that pure linoleic acid, or at least a highly concentrated linoleic acid, would be

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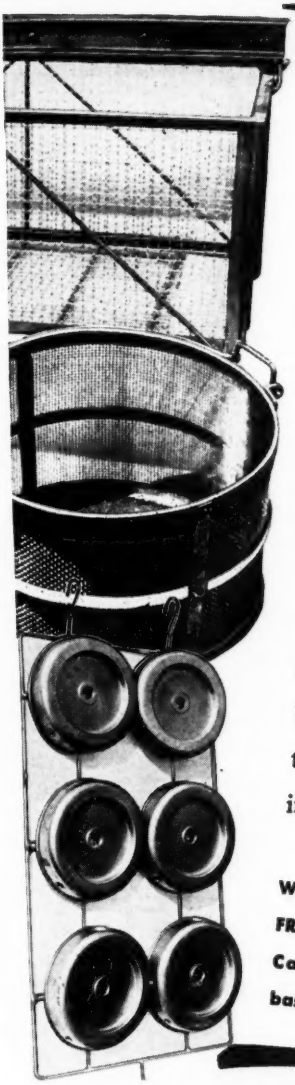

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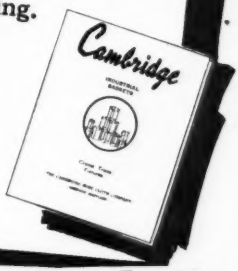

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desirable as a constituent of alkyd resins. Obviously, a fatty acid mixture containing an even higher percentage of conjugated linoleic acid than dehydrated castor oil would also be desirable.

(5) **Modification of Alkyd Resins with Difunctional Reagents Which Will React at Essentially Room Temperature.** It was pointed out that there are several possible examples of this type of material, probably the most promising of which are the diisocyanates, which were developed to a large extent in Germany during the recent war. Even if use of these materials as the sole difunctional reactant does not come in the near future, it is quite likely that alkyd resins will be treated with a few per cent of diisocyanate to react with excesses of hydroxyl and carboxyl groups. Another series of compounds which may be of interest along this line is the diaminosilanes.

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It is also likely that in the future more attention will be paid to the evaluation and application of the new resins after they are prepared.

* * *

Pointers In Rinse Tank Design

THE savings and improved efficiency which can be realized through proper rinse tank design are often neglected in electroplating and other metal finishing operations. Some valuable pointers on rinse tank design have been discussed in a recent issue of The Iron Age (Apr. 15 1948) by J. B. Mohler in which it was brought out that maximum efficiency in rinse tank design and operation is not difficult to achieve so long as the principles involved are well understood. The measurement of two factors in finishing operations can serve as a basis for efficient rinse tank design and operation: first, the amount of contaminant retained on the work to be rinsed, and therefore brought into the rinse tank; and second, the amount of contaminant that can be permitted to remain on the work leaving the rinse tank without detracting from the quality of the finish produced or interfering with subsequent processing operations.

The conductivity meter was suggested as a method for measurement of drag-in and the measurement of total salt in the tank at any time. The measuring cell for the meter, according to Mohler, should have two platinized electrodes that may be dipped directly in the tank. Such a conductivity meter will detect very small amounts of salt in the rinse so that drag-in from a single rack of work can be determined by taking conductivity readings before and after introduction of a rack in still water, and then by adding the contaminant quantitatively to a clean tank to obtain the same increase in conductivity.

It is sometimes desirable to carry

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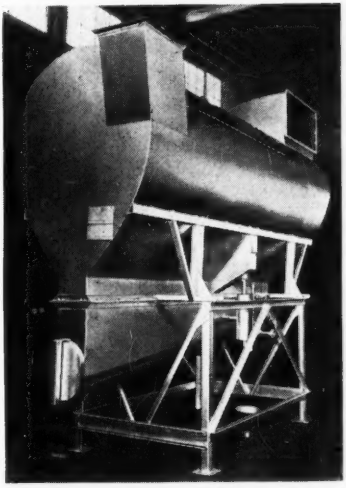

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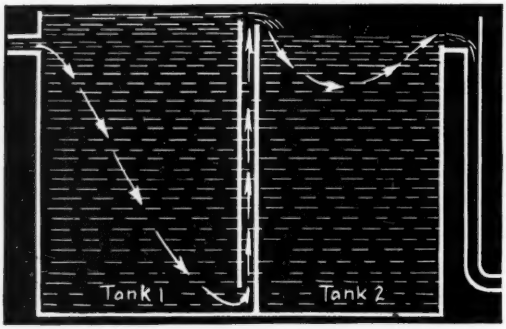

Fig. 8—A type of double-overflow rinse tank designed to prevent back-up of contaminated water from Tank 2 into Tank 1 as a result of rinsing heavy work
(*Illustration courtesy "The Iron Age"*)

out laboratory work to determine the maximum allowable salt concentration that can be permitted in the rinse without interfering with the quality of finished work by salt markings, or interfering with quality in subsequent processing steps. To establish the maximum flow for a single rinse tank the maximum salt concentration is taken to be the concentration that will eventually be reached for the steady flow, with salt entering on racks at regular intervals. This will be the equilibrium point where the amount of drag-in salt equals the amount of salt at the maximum concentration carried away by the flow in the time interval from one rack of work to the next.

There are a variety of standard rinse tank designs in use. The most popular design for hand operations has been found to be a simple running rinse, where water enters the bottom of the tank through a pipe extending depth-wise of the tank. The design proposed by Mohler, as an improvement over the conventional overflow tank, has a permanent pipe entering the bottom to allow full utilization of the cross-sectional area of the tank. If floating material is present in the rinsing operations, the design above may be modified to allow for entry of a part of the water near the top of the tank, to provide a sweeping action at the surface, the remainder of the water going in at the bottom of the tank.

Special attention should be given to rinsing operations where heavy precipitates or particles of scale are encountered. In many rinsing operations multiple tank systems, composed of two or more tanks in series using the same water, should be considered. A suggested design for such a multiple tank system is shown in Fig. 8.

* * *

New Anodic Treatment for Magnesium

A NEW anodic treatment for magnesium alloys has been described (see also "The Iron Age," Jan. 22, 1948) which forms a white crystalline coating that is an electrical insulator and is reported to be resistant to abrasion. Tests also indicate that the coating affords considerable corrosion resistance and is a good base for paints. The conditions for formation of the coating involve the use of a hot saturated solution of sodium carbonate and a high voltage. It is important that the sodium carbonate solution be as nearly saturated as possible; in fact, it is good practice to have an excess of the solid material present. Photographic grade or CP sodium carbonate monohydrate is recommended, in the interest of keeping the sodium chloride content below 50 parts per million.

The most satisfactory voltage for highly resistant coatings is in the range of 110 to 120 volts. However, higher voltages were found to produce

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more corrosion resistant coatings, but if the voltage is too high, for example over 125 volts, sparking across the film and subsequent pitting may result. The temperature of the bath should be maintained in the general range of 190 to 200 deg. F.; temperatures above 210 deg. F. may result in powdery coatings. The cathode to be used in the operation may be any metal not attacked by sodium carbonate; stainless steel, Monel metal, and copper have been used satisfactorily. Sometimes the parts being anodized may be conveniently held with a previously anodized magnesium sheet. Good electrical contact can be made by forcing the part into a tight fitting slot cut into the anodized sheet.

Of particular interest is the abrasion resistance of the coating. In conducting tests, specimens were abraded on a Taber Abraser using No. 17 coarse abrading wheels and a 1000 g. load. It was reported that minute holes appeared through the surface film of the new anodic coatings after 600 cycles of the abraser. Conventional chemical coatings for magnesium were described as being less resistant to abrasion than the new coating.

Permag Specialized Cleaning Compounds for cleaning metal before plating are described in a six-page folder now being distributed by Magnuson Products Corp., 50 Court St., Brooklyn 2, N. Y. Copy free upon request.

"Syntips" is the title of an eight-page booklet issued by the Hercules Powder Co., Wilmington, Del., describing in detail Cellolyn 104, a hard rosin-based resin synthesized specifically for use in nitrocellulose lacquers, and Cellolyn 102, a pale, hard resin of moderately high softening point valuable in nitrocellulose inks. Also included is a summary of the Hercules resins designed for ink, a brief resume of the cellolyn resin group, and company news. Copy free upon request.

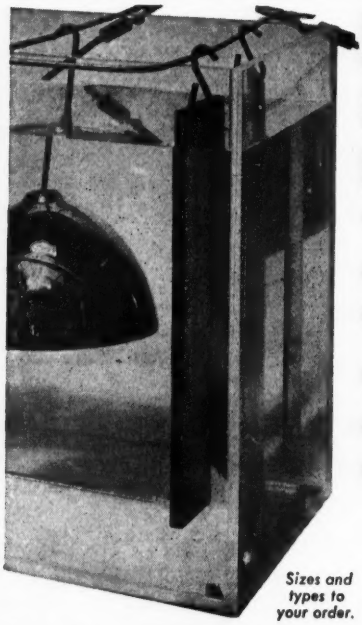

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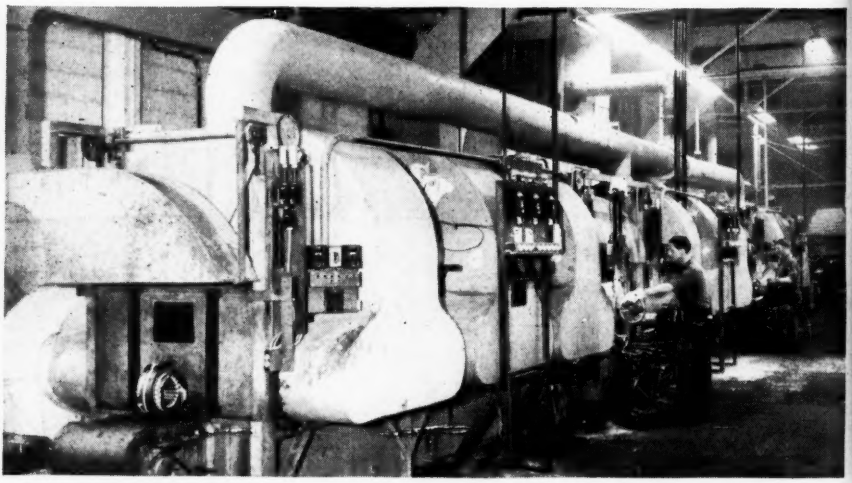
Fig. 1—This continuous, semi-automatic oven combines varnish dipping and baking of stators and armatures at the Reliance plant in Ashtabula, Ohio.



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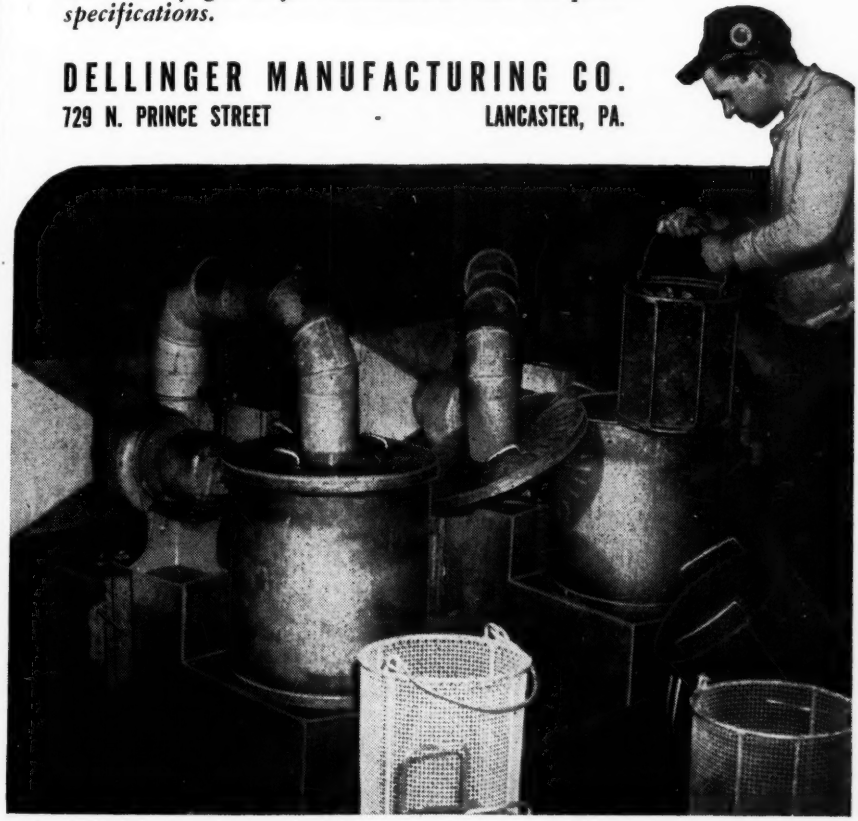

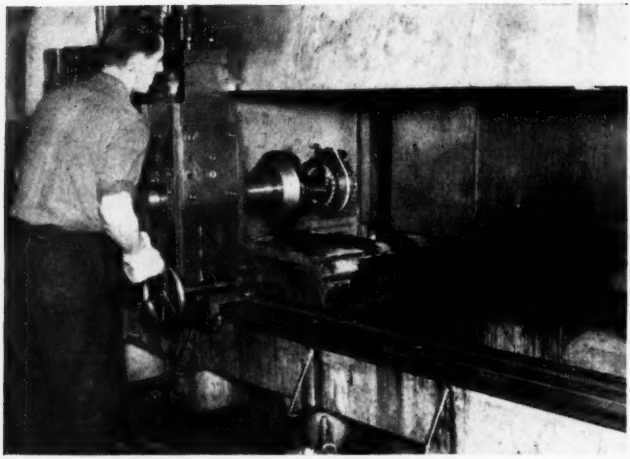

Fig. 2—From the first oven (preheat), stators and armatures are moved by a hydraulically - powered, manually - controlled manipulator into the first varnish dip tank.

erage of coil heads and all metal surfaces with a protective coating of properly baked insulating varnish.

The entire preheating-dipping-baking cycle is carried out in conveyorized equipment developed expressly for this particular Reliance production operation. The installation, illustrated in Fig. 1, incorporates three separate ovens, each of which is 15 feet 7 inches long. The first oven handles the preheating operation. The initial baking is done in the second unit, and final baking in the third. Each oven, of rectangular box-type construction, is served by an integral steel-slat continuous conveyor. Doors at both ends of the ovens are electrically controlled; their opening and closing synchronized with the operation of the conveyor, which indexes 21 inches at a time through each oven.

There are three separate heating zones in each oven, or a total of nine in the installation. Each zone is heated by moving air at high velocity over electric heating elements placed in a chamber immediately above the outlet of a blower-type recirculating fan. The heated air then passes through a duct extending across the top of the oven and down to a plenum chamber, from which it is directed into the oven through three specially designed nozzles. The air is returned to the fan through suitable openings in the oven casing directly opposite the nozzles.

Installed between the pre-heat and first bake oven, and between the first and second bake ovens, are recirculating type varnish dip tanks, and accompanying hydraulically-powered, manually-controlled manipulators. These manipulators pick up the stators or armatures from the preceding oven conveyor, move them into and out of the varnish, and place them on the following oven conveyor, as illustrated in Fig. 2.

The specialized dip tanks provide long sought-for advantages. Relatively small quantities of impregnating varnish are required in the system and the proportion used up completely in each day's operation is so large that no "old" varnish accumulates; the system uses fresh varnish constantly. Varnish control is simplified and those troubles present when large quantities of varnish remain in dip tanks over relatively long periods of time have been eliminated. Inspection is also simplified with the armatures and stators constantly in view of the operator during the application of the impregnating varnish and out of sight only for the 30 minutes or less of the heating and baking period. Smooth mechanical handling of the treated

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pieces prevents the abuse of the windings through mishap or pickup by chains and hoists. There is no drainage of varnish in the ovens so that all impregnant picked up during the varnish application remains in and on the winding. Cleaning of machine surfaces, where required, has been simplified by the use of a special stripper medium.

Originally designed to be heated with an oil-fired space heater, the ovens have since been converted to electric heating. This method, which was decided upon after some experimenting, demonstrated that with electric heat quality control could be maintained more easily and uniform results obtained more consistently with a minimum of expense and attention. The machine installed in the Ashtabula plant of Reliance was designed and built by the Power Piping Division, Blaw-Knox Company, Pittsburgh, under license arrangement with the Sterling Varnish Company, Haysville, Pennsylvania, which holds patent rights to the Zanderoll process.

New California Neon Sign Manufacturing Plant Designed For Assembly-Line Production

SIGNALIZING a major contribution to the manufacture of multiple-unit and custom-built neon signs on a straight-line high-speed production basis, Electrical Products Corporation of Los Angeles, Calif., recently transferred its operations to a new $500,000 plant. Constructed on a 5½-acre tract within a mile of the Los Angeles civic center, the new plant is easily accessible to main traffic arteries from all directions, permitting rapid transportation for erection and maintenance crews.

Designed and built by the Los Angeles District Office of The Austin Company, Engineers and Builders, from specifications of EPC engineers, the new factory incorporates facilities for large-scale operations and mechanical aids to optimum efficiency that mark a new step forward in the sign manufacturing industry. In addition to functioning as the company's manufacturing and assembly unit for Southern California, New Mexico and Western

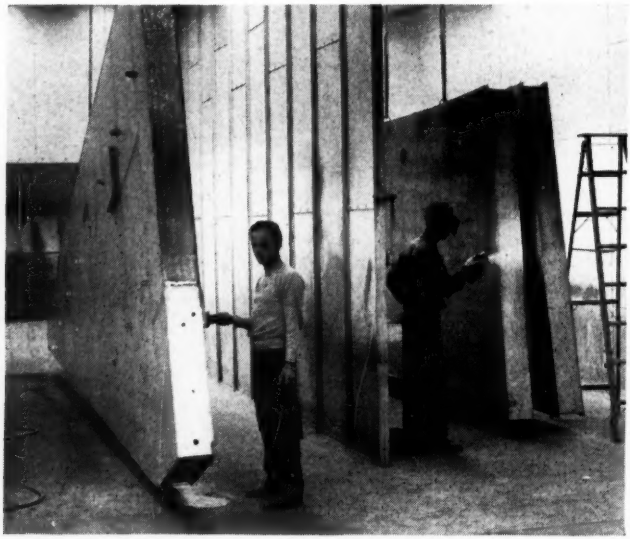
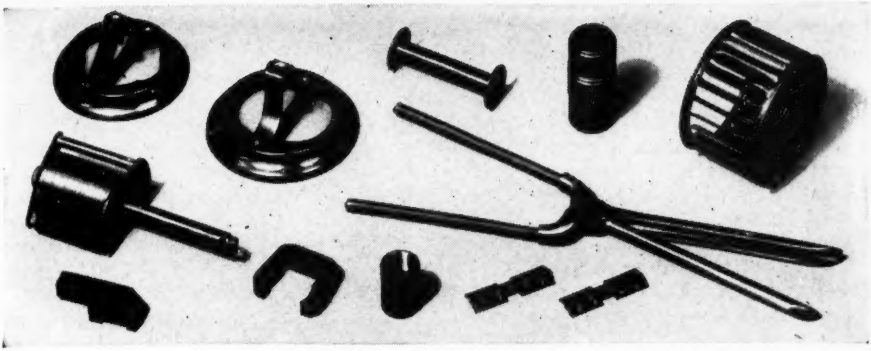


Fig. 1 — Illustration shows twin spray booths used for finishing multiple-unit and custom-built neon signs. A water wash system provides for removal of fumes and solids from paint overspray. (*Photo courtesy Electrical Products Corp., Los Angeles, Calif.*)



Du-Lite the Dependable Black Finish for Steel

WHAT DU-LITE IS: DU-LITE is a black chemical finish for steel. More than a coating, Du-Lite becomes an integral part of the steel surface itself to form a chip-, peel-, crack- and blister-proof new surface. Du-Lite finish will not fracture unless the steel to which it has been wedded fractures.

WHAT DU-LITE DOES: DU-LITE produces on all steel and steel alloy parts except stainless a handsome, uniform, oil-absorptive finish that endures and that possesses rust-resistant qualities when used as recommended. You can achieve either a matte or a glossy finish. Microscopic spines and edges that are present even on highly polished surfaces are smoothed and rounded by DU-LITE.

Imposed at a non-critical temperature, DU-LITE causes no dimensional change in the parts treated and effects no change in the characteristics of the steel. Du-Lite Salts are non-poisonous, economical to use; the process is simple to operate and inexpensive to install.

For these reasons and others you can learn by writing us, DU-LITE matches or excels in every respect any other process for the chemical blacking of steel, while it remains less costly to operate than most.

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THE *Du-Lite* CHEMICAL CORPORATION

100 River Road . . . Middletown, Conn.

Nevada, the factory serves as the administrative center of Electrical Products Corporation's service embracing 11 western states.

Providing 80,000 square feet of manufacturing area, the plant features a straight-line overhead conveyor system eliminating costly back-tracking and side storage. Materials handling is thus smoothly integrated into a continuous production sequence. Fabrication of neon signs is completely conveyorized from the receiving dock and stockroom, through sheetmetal operations, spotwelding, electrical finishing, painting and final tube assembly, to crating and shipping of the finished product.

With all metalworking, product-painting and assembly operations concentrated in a single 80-foot bay 300 feet long, a comprehensive interconnecting monorail network serving every manufacturing area is made possible through the use of The Austin Company's standard H-section welded steel trusses, which carry suspended loads at any point along their length. Location of the glass room immediately adjacent to assembly operations assures uninterrupted movement of glass tubing into the production line for finish installation.

Two 10-inch monorails, 16 feet apart, comprise the central conveyor system, which runs through the main bay the full 300-foot length of the building. A crossover switch enables traffic to be transferred from one monorail to the other. A right-angle craneway in the painting department interlocks with the two main rails. Spanning the 80-foot width of the bay, it connects the spray booths and the baking oven, which face each other. This craneway and a second unit interlock with auxiliary rails in the assembly and sheet metal departments, thereby allowing suspended displays to be sorted during assembly and on the shipping dock, expediting their movement to trucks. The rail arrangement enables one operator to roll signs on a trolley to any point in the shop. Trolleys, hand-operated, are on Timken bearings, moving with 15 lb. pressure to the ton load.

The monorail conveyor system starts at the receiving dock, where trucks are unloaded by power hoists running on two 16-foot lengths of the overhead rail network extending from the stockroom over the dock. Unloaded sheet metal is rolled to stockrooms and stored in large lifts.

Moving from stockroom into sheet metal fabrication, all sheets for painted enamel sign faces are put through a Stamco crimper to break up halation and remove background reflections. Standard angle bends, face stiffeners, and partitions with swedged lightening holes are prefabricated in quantity and racked for immediate availability.

Floating cement piers, 3 feet deep and independent of the floor, support a

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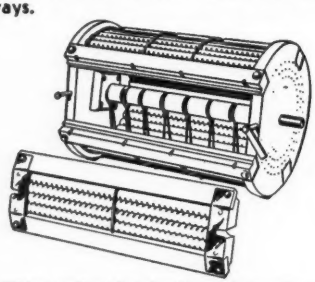

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Applied in various lengths and colors to wood, paper, cloth, metal, etc., the following effects are produced—

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*"Raymix"—a flock of rayon fibres, trademarked under U. S. No. 427949 to produce a suede effect of utmost realism on any surface.

*"Kingcote"—a cotton flock trademarked under U. S. No. 423572, producing a suede effect at minimum cost.

MOHAIR, VELOUR AND VELVET SURFACE

"Raycote"—a flock composed of uniformly cut rayon fibres to produce on any surface a pile effect such as velvet, plush, or velour. Made under U. S. Patent No. 2014947.

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"Harecote"—a flock composed of animal fibres, produces a durable carpet or rug material.

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300-ton Chicago brake, 30-ton Chicago and 45-ton Verson and other heavy sheet metal equipment. Cutting is performed with a 10-foot Pacific power shear and a 10-foot Streine power square shear, with smaller work handled by 5-foot Niagaras. Punch press operations are done on a Wiedemann 16-station rotary indexing punch; a 4-head Vulcan rotary index unit with a capacity up to 18-gauge; a 45-ton Marshalltown, and a 40-ton deep draw Rockford for punching hand hole and transformer doors, and covers.

With custom and multiple-unit production work going through on predetermined schedules, sign assembly proceeds down the center of the main bay, layout tables on the left and letter forming to the right. For better fusing, cleaner finish and faster operation, electric stitch welding is employed almost entirely, Taylor-Winfield equipment of 100 kva, 50 kva and 7½ kva being used. Special customwork tables are placed at one side of the assembly line. With electrical wiring and transformer installation meshing with the metal work along the assembly line, displays ready for surface coatings are then transferred via the cross crane to the paint department. Parts for porcelain enameling are shipped out for coating and re-enter the production line when returned.

Still conveyor suspended, the displays enter twin Acme spray booths, 10 ft. x 14 ft., 25 ft. deep, each equipped with a waterwash system for removing all paint body from spray fumes, the ventilation operating at 150 ft. per minute air speed. Figure 1 shows signs being painted. Special overhead housings accomodate the monorails, allowing a lowered ceiling for the glass-fronted lighting units, each booth having 8 standard 4-tube Epco fixtures.

From the spray booths, displays are conveyed directly into a 7 ft. x 19 ft., 24 ft. deep oven for baking enamel and force drying in speeding up multiple-coat painting. Two monorails extending into the oven increase baking capacity. Oven is a gas-fired air circulation type, equipped

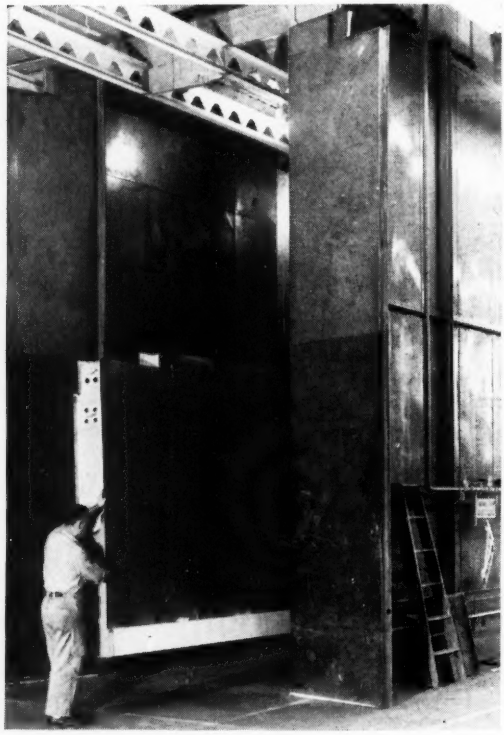
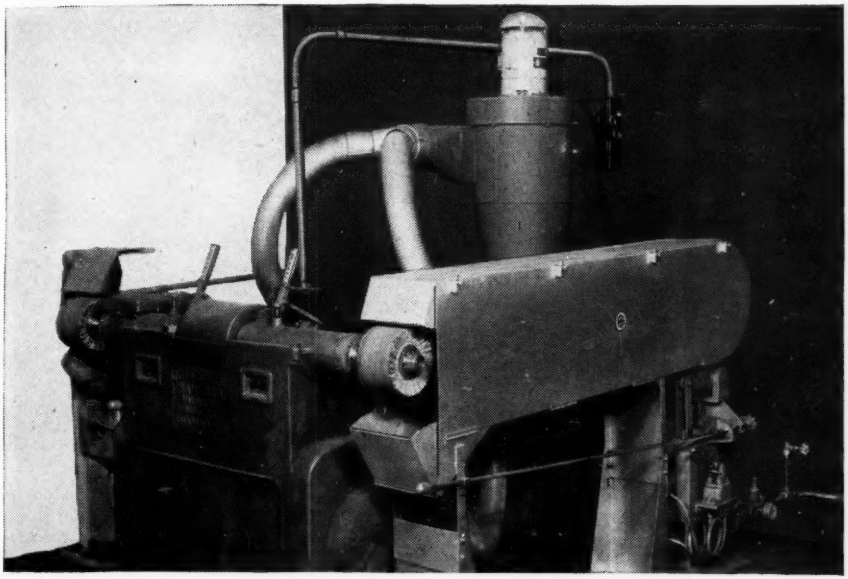


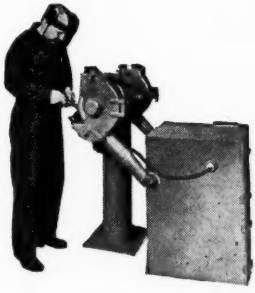
Fig. 2—Illustration shows a huge sign being loaded into a gas-fired air-circulation type oven 7 feet wide x 19 feet high x 24 feet deep for baking and force drying. *(Photo courtesy Electrical Products Corp., Los Angeles, Calif.)*

TORIT DUST COLLECTORS



are "belting" the dust problem on this 14-foot abrasive belt machine

Here is a TORIT FB Type Dust Collector and all necessary piping set into available space back of a polishing lathe and backstand idlers. The abrasive belt is completely shielded by the Torit-designed hood, yet is accessible for changes and adjustments. Compact, efficient set ups like this pay dividends in low operating costs and good working conditions.



Self-contained TORIT Dust Collectors are easy to fit into your production set up. They range in size from ⅓ to 5 HP, and models for all standard dust collecting jobs are available for immediate delivery. For details and the latest TORIT catalog, write:

TORIT MANUFACTURING CO.

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Fig. 3—A view of the assembly area of the Electrical Products Corporation plant showing completed signs ready for shipment (*Photo courtesy Electrical Products Corp., Los Angeles, Calif.*)

with two top blowers. Figure 2 is a view of the loading end of the oven.

Reconveyed to the main assembly line, displays then move into the final assembly area, where tubing is installed, final electrical work completed, tube testing done, and final inspection made. A view of the assembly area is provided in Fig. 3.

Cambridge Conveyor Belts for the conveying and treatment of industrial products are covered in a 132-page wire-bound catalog published by The Cambridge Wire Cloth Co., Cambridge, Md. Well-illustrated throughout, the catalog is divided into eight sections having the following headings: Cambridge Belt Applications; Cambridge Belt Constructions; Choice of Material (Metals and Alloys); Cambridge Belt Specifications; Cambridge High Temperature Belts (Lehr and Industrial Furnace Belts); Conveyor Design; Installation and Operation; and Tables, Questionnaires, Etc.

Copy of the catalog is available to shop officials addressing requests on their company letterheads.

Houghto - Clean 220 Product Data Sheet. Complete data concerning the emulsion cleaner Houghto-Clean 220 is listed in a product data sheet currently available from E. F. Houghton & Co., 303 W. Lehigh St., Philadelphia 33, Pa. Properties of the emulsion cleaner, among them the formation of a stable non-foaming water emulsion and affinity for water, are outlined in the data sheet, together with suggested applications of the product. Copy free upon request.

"Enthonite 101" Liquid Plastic Plating Rack Coating for tanks, workholders and acid dipping baskets is described and illustrated in a four-page folder announced by Enthone, Inc., Dept. PF, New Haven, Conn. Copy free.

Binks Rotojet Spray Nozzles are described in Bulletin 14 issued by the Binks Manufacturing Co., 3118-3140 Carroll Ave., Chicago 12, Ill. The attractively illustrated three-color four-page bulletin describes the action of Rotojet Nozzles and their application to metal cleaning and treatment equipment. Diagrams, tables, and mechanical data of reference value to manufacturers, designers, and users of metal treating and cleaning equipment are included. Copy free.

"Chlorimet" Nickel-Molybdenum and Nickel-Molybdenum-Chromium Alloys for corrosive services are covered in an eight-page two-color bulletin issued by The Duriron Co., Inc., Dayton 1, Ohio. Particular attention is given to the use of these alloys for sulfuric acid, hydrochloric acid, and salt solutions and as to how they supplement other alloys for these corrosives. Many charts are included on corrosion resistance tests. Copy of Bulletin 114 free upon request.

Current Developments and Improvements is the subject of a 12-page booklet issued by Knapp Mills, Incorporated, Lead Lined Products Division, 121 Broad St., New York 4, N. Y. Taken from "History and Origins of Metallic Lead Products" written by Alfred P. Knapp, president, the booklet comprises the following topics: Sheet Lead Linings and Homogeneous Lead Linings; Lead Pipe Process Lines and Lead-Lined Steel Pipe Process Lines; Heating and Cooling Coils Fabricated from Lead Pipe and from Lead Covered Copper Tubing; Prefabrications, Special Extrusions, Machined and Cast Lead Products; Lead and Lead-Lined Valves; and Leaded Greases for Open Gears and Bearings. Copy free upon request.

Oakite Odor Control Booklet. The benefits to be gained with the use of specialized cleaning, disinfecting, and deodorizing materials in connection with industrial housekeeping plant sanitation programs are discussed in an illustrated 12-page booklet released by Oakite Products, Inc., 120 Thames St., New York 6, N. Y. The booklet covers two specific materials that are said to perform the cleaning, disinfecting, and deodorizing functions easily, efficiently, and economically; namely, Oakite Di-Sanite, which is claimed to combine a thorough all-purpose cleaning action with effective deodorizing ability, and Oakite Tri-Sanite, a three-fold sanitizing agent containing germicidal and fungistatic properties in addition to odor-killing and light detergent characteristics. The booklet lists many diversified applications of these materials in various types of industrial plants and provides working directions, recommended concentrations, and so on. Copy free upon request.

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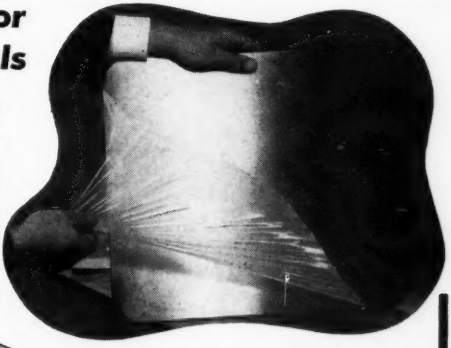
Striplastic is a protective plastic applied by spraying, dipping or rolling. It is used on stainless steels, high polished metal sheets, sheets in cold working or drawing, tools, dies and parts, and on sheets or metal parts before packaging. It protects against scratching and abrasion, and against rust.



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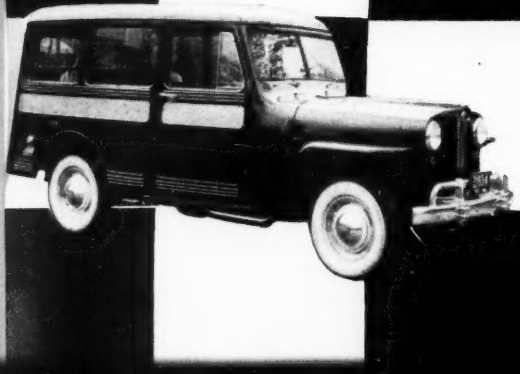
Finishes

ody of the Conn alto saxophone sted prior to receiving a heavy . The inside of the bell, the trade- the keys are hand burnished.

(Photo courtesy C. G. Conn, Ltd., Elkhart, Ind.)

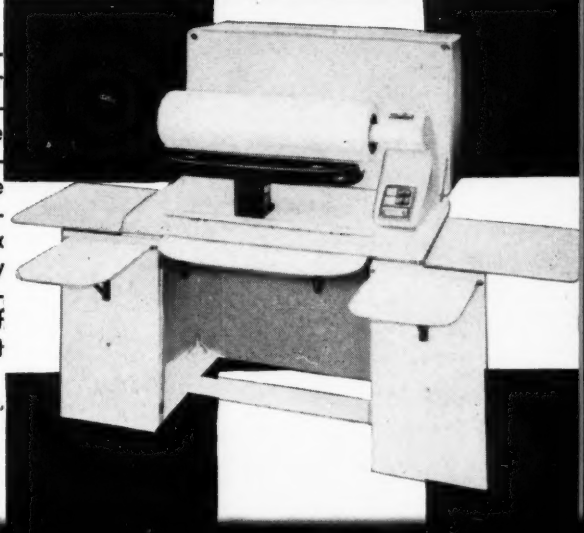


neral exterior surfaces of the Willys-Overland Jeep Station Wagon Sedan are finished in Pine Green Metallic or Tunissian Red synthetic enamel. A contrasting woven cane décalcomania is used on recessed door, side, and tailgate panels. Hub s, bumpers, and trim are chrome ted.

oto courtesy Willys-Overland Motors, Inc., Toledo, Ohio)

...that aid ...n appearance and utility

Aluminum frame parts of the offi... illustrated are first polished and t... to produce a satin, anodized fi...
(Photo courtesy The General Firep... Youngstown, Ohio)



Featuring a hinged cover, completely enclosed cabinet, door tender, two-speed roll, and finger-tip control in addition to knee controls, the deluxe model automatic home ironer shown in the accompanying illustration is finished in gleaming white Dulux enamel which provides for easy maintenance together with pleasing appearance. The shoe is of cast iron to afford maximum heat distribution and retention.

(Photo courtesy Bendix Home Appliances, Inc., South Bend 24, Ind.)

NEWS of the Industry

Executive Vice President Completes 45 Years with E. F. Houghton & Co.

George W. Pressell, executive vice president of E. F. Houghton & Co., Philadelphia, celebrated 45 years with that organization in June. During his 45 years with Houghton, he worked up through such positions as personal office boy to the president, a variety of office jobs, chief chemist, general sales manager, director of sales, secretary, vice president, and executive vice president.

In 1912 Mr. Pressell developed the first sulphurized cutting base, and was issued his first patent. Since that time E. F. Houghton & Company has been a national leader in manufacturing this type of product, as well as other industrial oils, chemicals, and leathers.

L'Hommedieu Celebrates 50th Anniversary

The Chas. F. L'Hommedieu & Sons Co., 4521 Ogden Ave., Chicago, Ill., manufacturer of plating and polishing machinery, is currently celebrating its 50th anniversary. In approximately May 1898 the founder of the corporation, Charles F. L'Hommedieu, opened a store at 34 North Canal Street near Lake Street with a few platers' and polishers' supplies. Shortly afterward he was joined by his daughter and two sons and in 1906 a corporation was formed with Charles F. L'Hommedieu, president, Charles Edward, treasurer, Arthur W., secretary, and Alice Margaret, director.

Charles F. L'Hommedieu was born in West Stockbridge, Massachusetts, on June 28, 1844 and died in Los Angeles on March 19, 1937. Mr. L'Hommedieu entered the employ of the Meriden Britannia Company when a young man and worked in the packing department. (This company is now the International Silver Company.) Later he entered the plating department where he learned the art of silver plating. Mr. L'Hommedieu worked as a plater in the cities of Boston, Philadelphia, Rockford, and Chicago before establishing his business.

Glidden Announces Technical Service

The Glidden Company is offering a new, refined technical service to its present and potential customers for industrial organic finishes, according to W. R. McKenney, industrial sales promotion manager.

"All industrial finishing problems are handled by a technical service department under the direction of a technical service director qualified by education and experience to act in that capacity. Every facility, including expertly trained specialists in all allied fields and complete mechanical and chemical equipment, is placed at his disposal to carry each problem to a successful conclusion.

The first step is to survey the customer's individual coating needs and production facilities. The technical service director then interprets the problem to his research, formulation, and finishing process specialists, drawing upon their knowledge and experience as well as from a tremendous fund of carefully accumulated data on plant layouts, methods, processes, and coatings. If requested to do so, he confers with those who supply the customer's surface pretreatments, and application and drying equipment, and plans for the coordination of production methods.

With all available facts at his disposal, the technical service director supervises and coordinates the individual efforts of his own research, formulation, process, and engineering specialists in their work of solving the customer's problem by developing a coating to do a particular job

(Left to right) Charles M. Dunn, Jr., H. P. Wertman, C. O. Hutchinson

in a particular way at minimum cost. He directs the pretesting of the selected coating under conditions duplicating those under which it will be used in production and, if requested, he also directs the production run in the customer's plant. In addition, he prepares specifications of the coating and for its correct usage to blueprint subsequent production procedures.

This type of refined technical service was developed at Glidden's Nubian Industrial Division in Chicago. Under the direction of C. O. Hutchinson, its technical service director, it has been perfected to its present high state of efficiency. Mr. Hutchinson, an Ordnance captain during the war, was in charge of protective coatings for ammunition. He is the author of many specifications for paints, varnishes, lacquers, metal preparations, and related products. He is a member of the American Chemical Society, American Society of Corrosion Engineers, and a registered professional engineer in the State of Illinois.

His staff of highly trained finishing experts, besides acting as the clearing house for all industrial organic finishing information, has achieved great success in helping customers obtain the proper finishing layouts, proper finishing methods, and proper finishing material in

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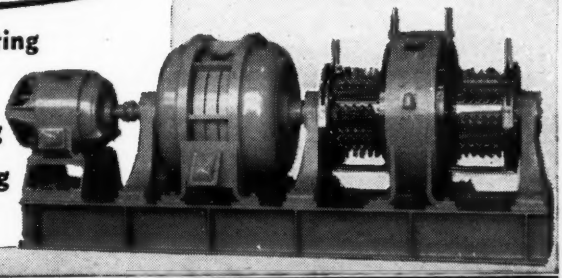
There's a Columbia M-G Set available for your needs, whether you have a small plating bath or a large continuous strip plating line. Capacities up to 20,000 Amperes; 6 Volts and up. Dependable, performance proved, for many years. Your inquiries solicited.



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Whatever your problem in finishing zinc or cadmium, there's an Iridite* to do the job. Iridite, a quick-dip, chemical treatment, offers you these three advantages:

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On plated parts Iridite forms a long lasting, sparkling *bright* finish that *stays bright*, even after handling, storage, exposure. On all surfaces, Iridite can be used to produce a variety of colored finishes.

2. RUSTPROOFING . . .
Resistant to the attack of water, gasoline, and ordinary corrosive conditions, Iridite provides the ideal *final finish* for all zinc and cadmium surfaces.

3. BASE FOR PAINT . . .
On any zinc or cadmium surface that must be painted, Iridite insures a better finishing system because the coating improves initial paint adherence, blocks corrosion *under* paint, blocks metallic soap formation *between* paint and metal.

Tell us the type of finish you need for zinc or cadmium — let us tell you how Iridite can help. For information and samples, write to:

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*REG. U. S. PAT. OFF.

order to produce the best quality of finished products at minimum cost in such fields as household appliances, electrical, furniture, automotive, and others.

Because of the impressive accomplishments by Glidden's Nubian Division, similar departments have been established with equally competent staffs of trained chemical engineers, chemists, and practical finishers in Glidden's Industrial Divisions in Cleveland, Reading, Pennsylvania and San Francisco. The technical service director at Reading is Howard P. Wertman; in Cleveland, Charles M. Dunn; and in San Francisco, R. R. Abernathy. These executives exchange records of accumulated knowledge and experience among themselves in their various localities and make them available to all of Glidden's Industrial Divisions located throughout the country and in Canada.

Houghton Builds New Plant

Under the direction of E. H. MacInnis, vice president and director of sales, E. F. Hougton & Company of Canada, Limited, manufacturer of industrial oils, chemicals, and leathers, recently began operations in a new plant located at 100 Symes Road in Northwest Toronto. The plant property covers 2½ acres of ground and is geographically situated so as to take full advantage of both rail and motor shipping facilities. Among the products to be manufactured at the new plant are surface active agents, industrial lubricants, heat treating salts, drawing compounds, cutting and quenching oils, carburizers, and so on.

New Du Pont Laboratory

A new Du Pont laboratory devoted to research and development work in the field of coated fabrics and allied products has been opened at Newburgh, New York. The three-story building is of reinforced concrete and brick and contains the most modern equipment for the development and testing of coated fabrics and sheetings under all sorts of conditions.

The laboratory is under the direction of R. E. Thomas and is part of the Chemical Division of the Fabrics and Finishes Department. Mr. Thomas is a graduate of Cornell University and has been engaged in chemical research on finishes, coated fabrics, and allied products for Du Pont since 1922.

Ditzler Promotes E. G. Knox

William T. Utley, divisional director of the Ditzler Color Division of Pittsburgh Plate Glass Company, Detroit, announces the appointment of E. G. Knox as one of two assistant sales managers under William H. Hogben, industrial sales manager. Mr. Knox has been with the Ditzler Division for over 14 years, four years of which were spent in the synthetic enamel research laboratory, three years in distributor sales, three years in plastic sales, and four years in industrial sales.

N E. Dabolt Retires from Atlas

After 29 years of active service, Newton E. Dabolt has retired from the Atlas Powder Company as sales manager of industrial finishes for the New York City office. He first came with the company in 1914 as a lacquer salesman in the metropolitan area, after being with the General Electric Co., Pittsfield, Massachusetts.

Mr. Dabolt is a graduate of Syracuse University, where he received his B.S. in chemistry.

Philadelphia Quartz to Move General Offices

Philadelphia Quartz Company, manufacturer of silicates of soda, has announced the removal of its general offices from 121 South Third Street, Philadelphia, where they have been located for almost a half century. On August 2, 1948, the offices will be in the Public Ledger Building, Independence Square, Philadelphia. The company is to occupy the office space on the eleventh floor.

This month also marks the completing of 117 years of business for the Quartz Company. It was started by Joseph Elkinton as a soap and candle manufactory in Philadelphia on July 21, 1831. Early in the 60's, the Elkintons produced silicate of soda for their own soaps, and soon after for other soap manufacturers.

The Philadelphia Quartz Company name was first used in 1864 when a new plant was built for producing silicate of soda. Soap and silicates continued to be manufactured until 1904, when silicates became the exclusive products of the company. From the original use in soap making, the company's research has extended the list of uses to a large number of industries.

Industry's 3 Newest

COLD STRIPPERS

Fast! Economical! Safe! New!

"UNISOL"—For removing all baked enamels! Used cold — Non-inflammable — Non toxic — Strips baked enamels in seconds — Used for all type metals — Requires no rinse — Non injurious to hands or clothing.

"UNISOL No. 2"—A new cold stripper for japans and vinyls—Non inflammable—Strips tough japans and vinyls in matter of minutes—Used for all type metals.

"STRIPPER 202"—Something new for removing "stop-off" lacquers in seconds—Will not tarnish highly polished metal surfaces—Non inflammable—Used cold—Non toxic.

Samples and further information supplied on request.

CHEMCO PRODUCTS CO., Inc.

1059 EAST 76TH STREET • CHICAGO 19, ILLINOIS

Egyptian Lacquer Augments Field Sales Force

Philip Beach, assistant director of sales for The Egyptian Lacquer Manufacturing Co., Newark, N. J., has announced the appointment of John L. Mand as a sales representative in the Eastern New York and Vermont areas.

Further revisions include the addition of John B. Bricker to the sales staff in the Chicago district and the appointment of Jack Malool as special sales representative in Metropolitan New York.

Heads Link-Belt Office in Wilkes-Barre

The Link-Belt Co., 307 N. Michigan Ave., Chicago 1, Ill., announces the appointment of Crozier S. Wileman as district sales manager at Wilkes-Barre, Pennsylvania, to succeed A. C. Williams, who has retired after 43 years of service. Mr. Wileman entered the employ of the Link-Belt Philadelphia plant in October 1924 in the capacity of tracer and detailer in the engineering department. He was transferred to the engineering standards division in 1926, and to sewage treatment plant engineering in 1928.

Promotion to the sales department came in July 1931, when Mr. Wileman moved to Chicago as district sales engineer specializing in the application of sewage and water treatment plant equipment in the central division territory. He was transferred to the company's Cleveland office in 1939 to serve as district sales engineer for all Link-Belt products, and to the Philadelphia district sales office in 1945 in a similar capacity. Mr. Wileman will be assisted by Alton H. Ziegler, who also has recently been transferred from the Philadelphia district sales office.

RESTORE PAINT IN 2 MINUTES

PER GALLON WITH
MIRACLE BLUE - BOY
5 GALLON
PAINT REJUVENATOR

Paints, lacquers and enamel products can be restored to their original consistency without opening the can. Units available to handle from ¼ pint to 50 gallon drums. Immediate delivery.

Originators of paint rejuvenating equipment---sixteen years—thousands of satisfied users.

Write for folder & prices

MIRACLE PAINT REJUVENATOR CO.
128 E. 10th Street St. Paul 1, Minn.

Dravo Distributor Announced

Wilson C. Blake Co., 190 Beacon St., Hartford, Conn., has been appointed distributor of Dravo "Counterflo" Heaters in Connecticut and Western Massachusetts by the Dravo Corp., Pittsburgh, Pa. The Blake Company has been active in the engineering and sales of heating and power plant equipment for 24 years.

The Dravo heaters, fired by gas, oil, or coal, are used for comfort heating, summer ventilating, process heating and drying, and tempered make-up air, and find application in all types of industrial and commercial structures.

Third National Instrument Conference and Exhibit

The 1948 American Instrument Fair is the designation of the exhibit to be held in connection with the Third National Instrument Conference scheduled for Convention Hall, Philadelphia, Pennsylvania, September 13 through 17. Sponsored by the Instrument Society of America, the conference will include many educational features of interest to engineers and instrument men in general.

A complete technical program involving subjects of general interest has been arranged. In addition, Dr. E. D. Wilson, head of the Chemical Engineering Department, Worcester Polytechnical Institute, and chairman of the I.S.A. Education Committee, will direct the presentation of short refresher courses on Electrical Measurements and Industrial Instruments. Business meeting of the Instrument Society of America, roundtable conferences, an A.S.M.E. luncheon, and an annual banquet will be included in the program.

Third Annual Meeting Held by N.A.M.F.

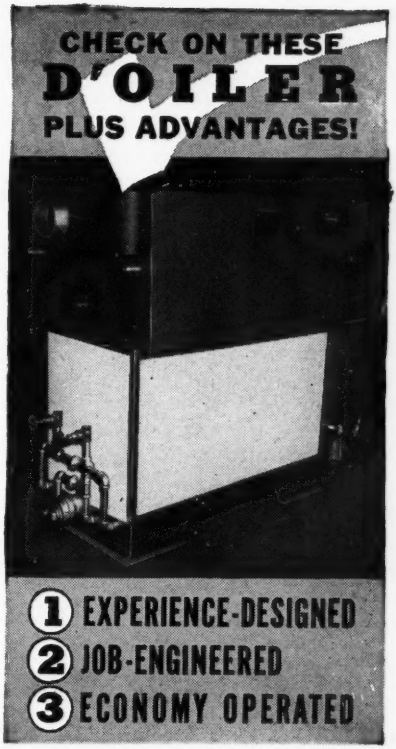
The National Association of Metal Finishers, with headquarters in Detroit, Michigan, held its third annual meeting in Atlantic City, New Jersey, on June 27, in conjunction with the 35th annual convention of the American Electroplaters' Society. The association is composed of individual job platers throughout the country and is also a federation of local and regional associations from Boston, Chicago, Detroit, Kansas City, Los Angeles, New York, San Antonio, and St. Louis.

Officers elected for the coming year were: president, Paul Henning, Detroit Plating Industries, Detroit, Mich.; 1st vice president, R. A. Campisi, Industrial Enameling Corp., Boston, Mass.; 2nd vice president, H. E. Coombes, Crown City Plating Co., Pasadena, Calif.; 3rd vice president, D. J. Griffin, Birmingham Plating Works, Birmingham, Ala.; treasurer, W. O. Zinn, National Plating Co., Chicago, Ill.; and executive secretary, Raymond M. Shock, Detroit.

Accomplishments of the past year were reviewed which included the following: (1) reduction of permissable exports of chromic acid so that more of it was available to the job platers throughout the country; (2) publication of a metal finishing manual with technical and financial data to aid the job plater in his business; and (3) publication of the first national directory of job platers and finishers which cross-indexes geographically every type of plating and finishing service rendered by its members. According to Raymond M. Shock, executive secretary, plans for the coming year include continued work to relieve scarce items required by the job platers and the increase of membership by formation of additional local associations and through individual memberships where no local associations exist.

Abraham A. Shimer Passes

Abraham A. Shimer, retired engineer of the Hercules Powder Company, died July 10 in Graduate Hospital, Philadelphia, Pa. Mr. Shimer, who lived in Wilmington, Delaware, was born in Milton, Pennsylvania. Following his graduation from Lehigh University in 1899, he worked with the Penn Steel Company as superintendent of construction and later with the New Jersey Zinc Company as chief engineer at the home office.



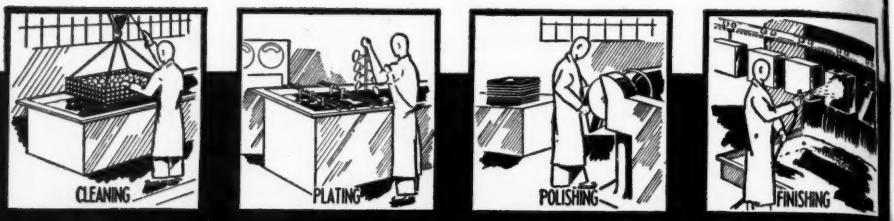
FOR THOROUGH METAL CLEANING

The D'OILER Vapor Spray machine, illustrated above, can be used as a vapor-spray, or a straight vapor degreasing unit. Drain table recaptures dragout from basketed parts . . . all-around insulation reduces heat losses . . . exhaust duct on two sides safeguards operator . . . pump drive for standby solvent eliminates hand pouring.

Every D'OILER type is built to do a specific job . . . is designed with the "on-the-job experience" necessary to provide a degreaser that does the work, in the required volume, economically.

Our engineers will gladly advise on degreasing problems; your inquiries will receive prompt attention. Write today.

Mechanical
PROCESS COMPANY
P. O. BOX 88, SOUTH ORANGE, N. J.



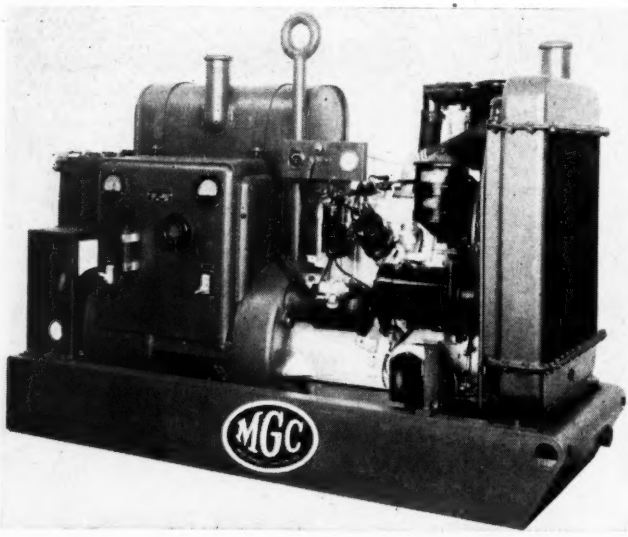
New Equipment and Materials

MGC Magnet Generator

A gasoline engine driven generator to supply power for handling scrap or pig iron in conjunction with a magnet crane has been announced by the Motor Generator Corp., Troy, Ohio. The magnet generator is available in six sizes, ranging from 5 to 25 kw., and is compact, light in weight, and designed for easy installation in a crane operator's cab.

Power is furnished by a commercial automotive-type gasoline engine. A Diesel engine is also available if ordered specifically. The unit is connected directly to and on a common structural steel base, and is designed to be drip-proof and self-ventilated.

All models are furnished complete with six-volt battery ignition, push-button starter, radiator, and fuel tank, fully assembled and ready for service.



MGC Magnet Generator

Unichrome Tape 705

A rack coating material designated as Unichrome Tape 705, product of United Chromium, Inc., 51 E. 42nd St., New York 17, N. Y., may be used to insulate racks, repair damaged rack coatings, provide a chemical resistant coating, and furnish a stop-off coating for selective plating.

According to the manufacturer, Unichrome Tape 705 is a vinyl-base material. The tape may be applied to racks or process items by wrapping in the

usual manner. If a continuous coating is desired, the tape may be sealed by heating for 15 minutes at a temperature of 275 to 300 deg. Fahrenheit.

Capitol Model B High Speed Spray-Bake Conveyor Machine

The need for a standard machine for finishing relatively small parts in large quantities furnished the background for the development of its Model B High Speed Spray-Bake Conveyor Machine by the Capitol Machine Co., 36 Balmforth Ave., Danbury, Connecticut.

Designed to spray clear or colored organic finishing material automatically on small parts up to 3 inches in diameter and 5 inches high, the machine may be served by one operator who merely loads and unloads the work holders. Work is processed on spindles mounted on a variable-speed, chain-type track. Provision is made for rotating spindles and work holders as they pass through the spray booth. After spraying, the parts pass through a circulated-air drying chamber and finally through two insulated baking ovens in which the proper baking temperature may be established and thermostatically controlled. A cooling chamber completes the cycle of this endless-belt machine.

Flexibility for job change has been provided by the manufacturer in three ways. The track speed is variable; the rotation of the work holders may be adjusted; oven temperature may be maintained at any desired temperature between 100 and 600 deg. Fahrenheit.

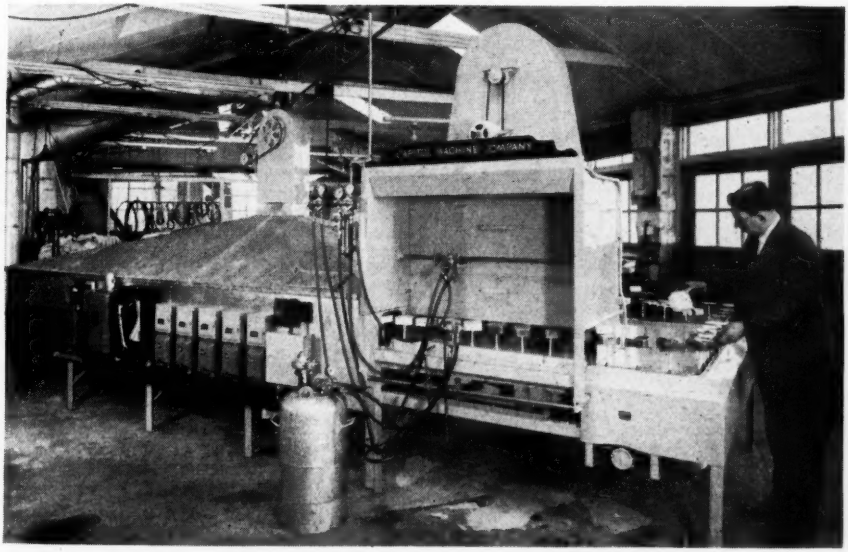
Strip-Kwik Paint Remover

Designated as Strip-Kwik, a non-flammable paint remover has been announced by Leon Finch, Ltd., 728 E. 59th St., Los Angeles, California.

The manufacturer states that on-the-job tests indicate that stubborn films of baked enamel, varnish, synthetic enamels and paints can be removed quickly and thoroughly. Chemical neutralization is said to be unnecessary when this remover is used. Metal surfaces from which the finish has been stripped away may be refinished immediately after rag-wiping, steam or hot water flushing.

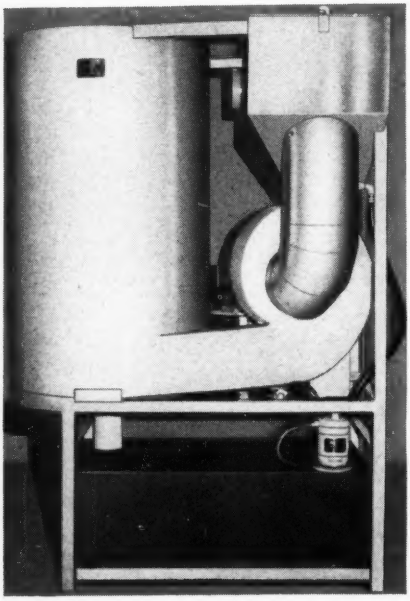
The remover will not affect aluminum, copper, iron, brass, and their alloys during the removal period, it is claimed. When used as directed, health hazards will be minimized.

Capitol Model B High Speed Spray-Bake Conveyor Machine



Niehaus Dust Separator

Product of the Industrial Electroplating Co., Inc., Indianapolis, Ind., the Niehaus Dust Separator illustrated here-



Niehaus Dust Separator

with employs wet methods to remove from the air the dust and foreign particles that result from polishing, buffing, and grinding operations.

The unit is designed to mix finely divided particles of water with dust-laden air and, by centrifugal action, wash out the entrained foreign material. Clean air is discharged from the top of the machine into the shop, eliminating heat loss. The unit contains its own blower and water recirculating systems. Refuse is collected in a portable tank beneath the unit, making for easy disposal.

The Niehaus Dust Separator contains no filters or bags, and the wet methods employed eliminate fire hazards, it is claimed. The unit is designed to provide a 2-inch static pressure for exhausting four regular size buffing or polishing wheels up to 16 inches in diameter. Where conditions require, the unit supplies 4-inch negative pressure for three wheels, and a maximum of 6 inches of pressure is available for exhausting two wheels.

The unit is delivered complete with motor, pump, and motor controls, and is designed to be placed alongside the machines being exhausted.

"Lustralloy" Nickel Plating Process

"Lustralloy," a plating process which is designed to permit uniform nickel plating to be obtained without the use of electric current, has been made available by the Lustralloy Sales Corp., 10 E. 52nd St., New York 22, N. Y. Said to leave a bright high quality finish that is tarnish and corrosion-proof, the process may be applied to any base metal with excellent bond, it is claimed.

The Lustralloy Nickel Plating Process, it is stated, can be successfully employed on products where sharp corners must be plated without excess build-up or "beading" and where it is necessary to surface inner tubing walls with an inside diameter of 0.20 inch. Through the use of heat treatment which is at relatively low temperature and harmless to the Lustralloy finish or most base metals, Lustralloy may be hardened to as high as VPN 900 with unusual ductility. Hardness at this level is said to equal that of most hard chromium plate, and the wear resistance of Lustralloy is claimed to have been found equally comparable. This treatment also provides for inter-diffusion of Lustralloy with the base metal to form an indestructable bond and, at the same time, shows any poorly bonded areas, by the formation of blisters, as a positive means for inspection, it is claimed.

For a real good polishing job use

Keystone TURKISH Emery

FRESH SUPPLY AVAILABLE

KEYSTONE EMERY MILLS *Write for Sample* 4316 Paul St., Phila., Pa.

General Purpose Hand Truck

A lightweight, rugged general purpose hand truck is now available from General Scientific Equipment Co., 27th & Huntingdon Sts., Philadelphia 32, Pennsylvania.

General Purpose Hand Truck

According to the manufacturer, outstanding features of this hand truck are the two chime hooks. which are adjustable, used to lock barrels and kegs of different heights securely in position. The truck is well balanced so that most of the load is carried on the wheels, a factor favoring operating ease.

The truck is regularly furnished with hollow-center, puncture-proof cushion tires with lug base and Durex self-lubricating bearings. Where acid and oil resistant wheels are needed, the truck can be furnished with aluminum wheels.

Turco Transpo

Turco Transpo, a non-inflammable, non-corrosive, fast acting, long-lived cold tank material for the removal of carbon, sludge, grease and paint, is now being offered by Turco Products, Inc., 6135 S. Central Ave., Los Angeles 1, California.

Free rising, Turco Transpo is a two-layer material comprised of a floating chemical seal and a lower layer of po-

DRAWCO
DRAWING COMPOUND
&
GRAINLOCK
POLISHING-WHEEL CEMENT
Two of the oldest names in the field
INDUSTRIAL LUBRICANTS COMPANY
5712 TWELFTH STREET
DETROIT 8, MICHIGAN

tent cleaning agents. Designed to provide peak efficiency at room temperature, there is said to be no need for agitation or heating to maintain year round satisfactory cleaning action.

"Flash-O-Lens" Magnifier

Designated as "Flash-O-Lens," an illuminated magnifier designed as a handy portable instrument for all types of inspection work has been announced by E. W. Pike & Co., 492 North Ave., Elizabeth 3, N. J. As the name of the product implies, Flash-O-Lens is designed to provide an illuminated magnified field of vision which makes possible accurate product inspection.

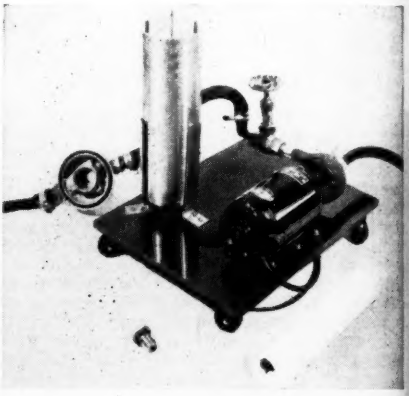
"Flash-O-Lens" Magnifier

Various models of the Flash-O-Lens are available so that many different inspection operations may be performed with this product.

Sethco Filter Pump Unit

Sethco, 105-107 150th St., Jamaica 4, N. Y., announces the development of a small filter pump unit especially adapted for either periodic or continuous filtration. The unit is constructed of stainless steel throughout and is said to be suitable for filtering all of the common plating baths. Since only a small volume of liquid is contained in the filter, all of which is recoverable, the unit is claimed to have definite advantages for use with precious metal baths.

According to the manufacturer, the Sethco Filter Pump Unit is extremely simple and economical to operate. Only three minutes are said to be required to set up the unit, and 20,000 to 40,000 gallons of solution can be filtered through each filter tube before it requires changing, the manufacturer states. The unit is supplied complete with a motor, pump, and filter mounted on a laminated plastic panel. The 110-volt motor is designed for operation on either a.c. or d.c., and the entire unit weighs 30 lb., thereby providing for easy portability.



Sethco Filter Pump Unit

The filter tube is made of special cotton yarn wound around a stainless steel core and is said to require no filter aids to remove even collodial particles. The

LUSTREBRIGHT

This bright nickel process produces brilliant, lustrous, adherent nickel deposits that may be chromium plated. Merely add LUSTREBRIGHT to your present cold or lukewarm nickel solution. Work comes from plating tanks or mechanical barrels bright and shiny. No special solution or change in equipment necessary. Write for information.

W. C. BRATE COMPANY

Established 1860

18 Market Street Albany, New York

removal of organic matter, grease, and oil from solutions is claimed to be a simple, clean, and efficient procedure. A maximum filtration rate of 100 gallons per hour is recommended for maximum efficiency, although filtration rates as high as 250 gallons per hour are possible. The filtration rates can be adjusted to any desired flow between 0 and 250 gallons per hour by a simple twist of a stainless steel valve.

"Prep-N-cote" Phosphatizing Method

Known as "Prep-N-cote," a method designed for the cleaning, preparing, and phosphatizing of ferrous metal surfaces and aluminum alloy surfaces to provide for maximum paint durability is announced by the Neilson Chemical Co., 6561 Benson St., Detroit 7, Mich. Said to show excellent results under humidity and salt spray fog tests, the process is likewise claimed to show excellent results for paint durability under impact or mandrel tests.

In using Prep-N-cote, the process may be varied to meet the manufacturer's requirements and equipment which he has available. The process may be adapted to the simplest two-stage spray washer or may be expanded to utilize spray washing machine installations consisting of 3, 4, 5, or 6 stages of processing. Regardless of the number of stages of the washing machine installation, Prep-N-cote is said to require the use of only mild steel equipment throughout.

The phosphate coating provided by the Prep-N-cote phosphatizing method is claimed to offer unusual protection against rusting and corrosion, provide for efficient cleaning of oils and greases from the metal surfaces, and result in highly satisfactory paint adhesion and paint durability. In addition, the process, it is claimed, does not require absolutely rigid control of the individual stages of operation and the methods of testing or checking the operating solutions are simple and can be readily learned.

Highflex Air Hose

A new Highflex air hose for small tools which weighs less and is said to be stronger than the ordinary hose used in

FASTER REFINISHING WITH
ELECTRO COLD STRIPPER

▶ No more long waits while slow-acting paint removers do their work like a team of lumbering oxen. Simply dip the article into Electro Cold Stripper and—Presto!—you can see the old finish literally "pop off" before your eyes. Wash with a pressure stream of water or wipe well with rag and REFINISH IMMEDIATELY. No fuss, no waiting, no bother.

▶ Used cold. Non-inflammable. Non-injurious to hands or metal when used as directed.

▶ Removes paints, enamels, synthetics, lacquers and wrinkles in minutes—not hours. Especially effective on hard-to-remove baked-type finishes. Will not harm even precision finished aluminum, copper, brass, magnesium, zinc, steel, cast iron or their alloys in time required for removal of paint film.

Write for sample and quotations—or order 5 gallons at drum price.

ALLIED FINISHING SPECIALTIES CO.
2637 W. GRAND AVE. · CHICAGO 12, ILL.

this service has been announced by The B. F. Goodrich Co., Akron, Ohio.

Among advantages cited for the new product by the manufacturer are that it provides for easier handling, the decrease in weight making the tool line easier to move; and it can be more efficiently used in close quarters.

Attractively finished in a red cover that resists snagging, the new hose is not affected by lubricating oil, will not swell to cut air pressure volume, and will not decompose and cause an air tool to jam or choke with rubber particles, it is claimed.

The hose braid is scientifically designed for strength at the angle of maximum stress and the tube and braid for minimum expansion under pressure. The hose may be used up to 250 p.s.i. pressure.

Model No. A-10 Vari-Plater

Known as the Model No. A-10, a versatile selenium rectifier Vari-Plater for plating gold, silver, chromium, nickel, copper, cadmium, and so on, has been announced by the Lewis Electrical Manufacturing Co., 1943 Walton Ave., New York 53, N. Y. The Model No. A-10 is a complete packaged electroplating unit, requiring a minimum of space and operating immediately upon installation.

Features claimed for the No. A-10 Vari-Plater are: variable d.c. voltage (from zero to maximum); versatility (works in tandem—several units can be combined to raise voltage or amperage); instantaneous d.c. power (110-volt a.c. power, no warm-up period required); and sturdy construction with standard replaceable parts.

Model No. A-10 Vari-Plater

Johnson's Rust Inhibiting Wax No. 1568

A water-emulsion wax that is now being successfully used as a rust-inhibiting coating for metals has been developed by S. C. Johnson & Son, Inc., Racine, Wis. It is being marketed as Johnson's Rust-Inhibiting Wax No. 1568.

Applied by conventional dipping, spraying, wiping, or flow-coating methods, this emulsion forms a dry wax coat on the metal part that checks corrosion. The manufacturer claims that it is nonflammable and non-toxic. The coverage is between 2,500 and 3,000 square feet per gallon. It can be readily removed by degreasing if desired.

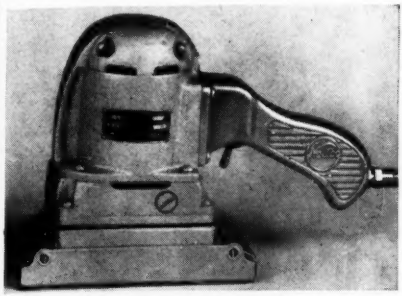
Johnson's 1568 Wax is now being used as a corrosion inhibitor on black-oxidized, phosphated, or untreated metal surfaces. It is also being used on painted and plated parts as a safeguard against scarring and chipping.

GOLD PLATING SOLUTIONS
In All Colors
Guaranteed 100% Pure Gold Content
Troy Weight - Color Constant
Tarnish Resistant
Proven Quality by the Acid Test
Write or call our experts about your plating problems
Davis-K-Products Co.
54 West 22nd St., New York 10, N. Y.
Oregon 4-4108
4-4109

ALAKA Lacquers
QWIK-BAKE Synthetics
ALAKATONE Hammered Silver
SYNTHALAK Air-dried Synthetics
Custom Tailored Finishes TO FIT YOUR REQUIREMENTS
LACQUER & CHEMICAL CORPORATION
222 FORTIETH ST., BROOKLYN 32, N.Y.

Nedco Model R.O. Sanding Machine

Identified as the Model R.O., a portable electric sanding machine of the orbital type with 55,000 oscillations per minute



Nedco Model R.O. Sanding Machine

and having a counterbalance to offset vibrations has been placed on the market by The Nedco Co., 87 Rumford Ave., Waltham 54, Mass. The sander, which weighs 7 lb., has an aluminum motor and gear case and utilizes one-third sheet of standard 9 x 11-inch sandpaper. One or several thicknesses of sandpaper can be used at one time. The pad is detachable from the machine, thus facilitating changing of pads or the use of different types of pads.

The air for cooling the motor is drawn in at the top of the vertical motor and exhausted at the bottom. Inspection plates are provided over the brush holders so as to facilitate inspection or cleaning of the brushes. Sealed ball bearings are used throughout the tool, and all gears are of the spiral tooth type and heat treated. The motor is a universal type, operating on either a.c. or d.c. at 110 or 220 volts.

Corodex Coil Clean

An easy-to-use liquid designated as Corodex Coil Clean and formulated to dissolve lime scale in hot water coil-equipped apparatus, hot water tanks, or automatic heaters has been developed by the Allied Products Co., Dept. C-67, 1133 Newport Ave., Chicago 13, Illinois.

It is claimed that Corodex Coil Clean will completely dissolve all lime and mineral deposits from copper, brass, bronze, iron, steel, or stainless steel coils. Hot water and steam coils, steam tables, tanks, refrigerator drains, unit coolers, condenser coils, compressor jackets, spray heads, and other processing equipment can be cleaned without injury to the coil or other parts, it is said. The manufacturer explains that even a completely lime-blocked passage can be opened with Corodex Coil Clean without removing the coil from the main installation.

Said to be non-explosive and non-inflammable, Corodex Coil Clean will not injure the metal with which it comes in contact or the hands of the user. It is available in various sized containers from 1 to 55-gallon capacity.

Vinsynite Primer

An easily-applied metal primer that has excellent adhesive strength has been developed in the laboratories of Thompson & Co., Oakmont, Pennsylvania.

Known as Vinsynite Primer, the new product can be applied on damp or slightly oily surfaces without degreasing

FREE

Information

on

COPPER STRIPPING

with

McKeon's

Liquid Sulphur

Sulphur Products Co.

Greensburg 5, Pa.

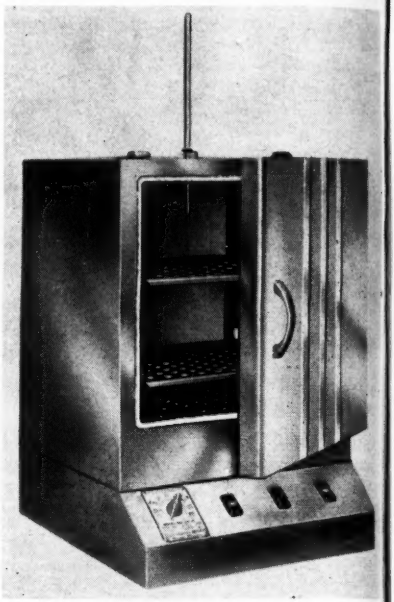
and still cling like a leech to the metal, it is claimed. Pre-treatment with etching solutions or solvent washes is said to be unnecessary. Vinsynite is an air-dry coating that can be applied by spray or brush so that production processing does not have to be done in a fixed position or with stationary equipment. It is said to be an excellent inhibitor and paint base.

Stainless Steel Electric Laboratory Oven

A new heating, baking, and drying oven made of polished stainless steel has been announced by the Modern Electric Laboratory, 6131 S. Wentworth Ave., Chicago 21, Ill. According to the manufacturer, the smaller models are made entirely of polished stainless steel. A larger model has a stainless steel interior, with an exterior of pressed steel finished in baked-on long wearing enamel.

Uniform temperature is secured from the heavy nichrome element which covers the entire bottom area. All models have a hydraulic electric thermostat.

The inside dimensions of the oven are 8 inches high x 8 inches deep x 8 inches wide in the 500-watt size; 12 inches high x 12 inches deep x 12 inches wide in the 800-watt size; and 14¾ inches high x 17¾ inches deep x 19 inches wide in the 1,750-watt size. Two smaller units operate from 110-115 volt a.c. The large unit can be had in 110 volts, a.c., or 220 volts, 1 ph, 60C, alternating current.



Stainless Steel Electric Laboratory Oven

General Scientific No. 750 Drum Pump

Equipped with a positive shutoff valve that is said to provide absolute protection against evaporation losses, a self-priming drum pump for alcohols, paint thinners, light oils, and other volatile liquids is now being marketed by the General Scientific Equipment Co., 2700 W. Huntingdon St., Philadelphia 32, Pa. Designated as the No. 750, the pump has a maximum capacity of 15 g.p.m. and includes no pistons, rings, leathers, or rotating parts to stick or wear, the manufacturer states.

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Model A-10, 110 V, AC

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LEWIS ELECTRICAL MFG. CO.

1943 Walton Ave., New York 53, N. Y.

The design of the pump includes a special diaphragm which is made of heavy cord-fabric vulcanized between synthetics and which, it is claimed, does not dry out, swell up, rust or corrode and is unaffected by petroleum products, alcohol, and most other fluids. A handy fill-spout facilitates filling of measuring cans and containers. All waste is said to be prevented by an automatic drain-back which is arranged to completely drain the hose and pump when the handle is lifted. A locking link, located near the middle of the handle, can be employed to prevent use of the pump by unauthorized persons.

General Scientific No. 750 Drum Pump

"Enthonite 101" Plastic Plating Rack Coating

Recommended as a coating for tanks, workholders, and acid dipping baskets, a liquid plastic plating rack coating known as "Enthonite 101" has been announced by Enthone, Inc., Dept. PF, New Haven, Conn. To obtain coatings varying in thickness from ⅛ to ¼ inch, the material is applied, by dipping, over a primer coat and baked at a temperature of 350 deg. F. or higher for a short period of time.

No loss is said to be experienced with the use of Enthonite 101 since there are no solvents to evaporate and all drippings can be reclaimed and reused. The coatings produced are stated to have excellent resistance to all types of inorganic solutions, particularly chromium plating solutions, The surface produced is glossy so that solutions do not readily wet it and considerable saving in dragout of solution is claimed. The coatings produced are said to be tough and resilient and will not chip even on rough abuse of the plating rack.

The resistance to attack or absorption by chromic acid is claimed to be a feature of this product.

Flexi-Mat Sponge Rubber Standing Mat

The Flexi-Mat Corp., 215 W. Illinois St., Chicago 10, Ill., has developed a sponge rubber standing mat having a firm tile rubber top surface for comfortable footing.

The mat may be cut in sizes to fit the requirements of the standee worker. Supplied in processed sheets 36 inches x 30 feet, for areas where oil conditions prevail, the mats can be supplied in oil resistant Maltese Neoprene with deep etched design on both sides to minimize the possibility of slippage. A standard sponge rubber mat is available for use in less critical applications.

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